American Gas Association MONTHLY

War Role of Industrial Gas

•

Introducing New Employees

•

Immersion Gas Tube Research

•

Plan Your Gas Kitchen—Now

•

Industry Maps Postwar Plans

May 1944

VOLUME XXVI NUMBER 5

"...and I'll just make a wish and all my household chores will be done..."

"It's my favorite post-war dream . . .

"I live in a house that's a model of convenience . . . my *all-Gas home* . . . where housekeeping is so easy it seems like a hobby instead of a chore!

"The kitchen is like a wonderful playroom . . . cool, clean, free from cooking odors . . . with a new Certified Performance Gas range that's fast, efficient, the last word in *precision cooking*. And how it saves food values and cooking time!

"My silent Gas refrigerator is a magical storeroom. Special cooling units keep all sorts of foods fresh longer . . . save hours of meal-planning and marketing!

"Even the faucet has a touch of magic! I turn on the tap and my automatic Gas water-heating system supplies me with all the hot water I need . . . *any* time I want it!

"And talk about comfort! . . . The entire house is always full of Springtime . . . no matter what the weather is outside. Thanks to my new Gas air-conditioning unit we stay as cool as an ocean breeze in summer . . . snug and warm all winter long!"

Only dreams, today . . . yes! . . . But tomorrow they'll be *realities*. For the tiny blue Gas flame . . . *the flame that cools as well as heats* . . . will make these and many more wonders-of-comfort come to life. You can make them come true faster . . . by using Gas wisely *now*...by saving for *your* all-Gas home of the future with every War Bond you can buy!

THE MAGIC FLAME THAT WILL BRIGHTEN YOUR FUTURE

AMERICAN GAS ASSOCIATION **GAS**

American Gas Association MONTHLY

CONTENTS FOR MAY 1944

The gas industry has played a prominent and, in many cases, spectacular part in the war effort due in large measure to the group of men represented at the Rochester War Conference on Industrial and Commercial Gas—reported in this issue. Many of these men were instrumental in developing gas applications and equipment which, since World War I, virtually revolutionized armament-making and made possible the pre-eminence of American ordnance on world battlefronts. . . . Government and Army officials alike, speaking at Rochester, paid unstinting tribute to the role gas played in arming the Allies with unprecedented speed and efficiency. . . . Mr. Young, in his chairman's address which leads this issue, gives a few highlights of this picture. A more complete story of one phase of this effort was contained in Mr. Cone's article on "New Horizons" in the last issue. . . . Other conference features in this issue are the important A. G. A. Laboratories' report on gas immersion tube research by Mr. Teller and Mr. Henry's comprehensive summary of the postwar program. The magnitude of the program laid out by the A. G. A. postwar committee, as outlined by Mr. Henry, testifies to the energy and foresight of that group.

PAGE

187 Impact of War on the Use of Industrial and Commercial Gas.....CHARLES G. YOUNG

189 Introducing the New Employee to the Job.....WILLIAM M. MUSSMAN

191 Utility Safety—Today and Tomorrow.....WALTER C. BECKJORD

194 Immersion Tubes—Gas Research Discloses Basic Performance Characteristics.....WILLIAM R. TELLER

199 Plan Your Kitchen—Now!.....VERNON E. SHEPHERD

201 Testing Gauges of Pressure Canners Is New Wartime Service of Gas Companies.....JESSIE MCQUEEN

203 Natural Gas Conference Offers Strong Program

204 Postwar Objectives—What the Gas Industry Must Do To Develop Its Market.....HALL M. HENRY

209 Postwar Home Building Forum

211 Personal and Otherwise

214 Affiliated Association Activities

216 Convention Calendar

217 Reducing Government Questionnaires Through Utility Subcommittees.....DAVID J. GUY

220 A Residential Gas Sales Promotion Program..RALPH P. WAGNER

222 War Conference on Industrial and Commercial Gas Is Outstanding Success

226 Coatings Useful for Distribution Systems.....KIRK H. LOGAN

227 Joint Production and Chemical Conference

228 Dog-eared for Technical Men.....LUIS HILT

232 Personnel Service

SUBSCRIPTION · $3.00 A YEAR

Published eleven times a year by the American Gas Association, Inc. Publication Office, American Building, Brattleboro, Vt. Publication is monthly except July and August which will be a bi-monthly issue. Editorial Offices, 420 Lexington Avenue, New York 17, N. Y. Address all communications to American Building, Brattleboro, Vermont, or to 420 Lexington Ave., New York 17, N. Y. All manuscript copy for publication should be sent to the editorial offices in New York. The Association does not hold itself responsible for statements and opinions contained in papers and discussions appearing herein. Entered as Second Class Matter at the Post Office at Brattleboro, Vermont, February 10th, 1922, under the Act of March 3, 1879.

Cable Addresses: American Gas Association
AMERIGAS, NEW YORK
American Gas Association Testing Laboratories
AMERIGASLAB, CLEVELAND

THE GAS INDUSTRY IN BRITAIN—Coke being removed mechanically from the coke ovens to the coke train. Another in a series of outstanding photographs taken by the British Council.

American Gas Association MONTHLY

JAMES M. BEALL, *Editor*

IMPACT OF WAR
. . . on the Use of Industrial and Commercial Gas

By CHARLES G. YOUNG

Manager, Springfield Gas Light Co., Springfield, Mass.

THE year 1943 promises to go down in American history as marking the turning point of the war and as the year in which the production of war materials reached unprecedented heights. As long as the global war continues, the important job for all Americans is to maintain the high level of our national productive output. In view of what was accomplished in 1943, this is no small task. The big job for industry in 1944 will be to produce all the war materials needed for the final drive to the successful termination of the European war and, in addition, to carry essential civilian production at previous levels, with a readiness to make whatever expansion may be permitted by release of materials and manpower.

Charles G. Young

Even though this year's requirements for such war equipment as tanks, small arms, ammunition and anti-aircraft units have been decreased, there is an urgent demand for increasing the production of aircraft, transportation, communications and heavy construction equipment. It is most heartening to read that serious material shortages have been eliminated and that reserve stock piles are being rapidly accumulated. Thus, having reached the plateau of war production, it is significant that the 1944 American Gas Association War Conference comes at a time when the gas industry's outstanding contribution to war production, and to feeding millions of our fighting men, has about reached an all-time high.

•

The full effect of last year's production program resulted in a record use of gas for industrial and commercial purposes. The tremendous heat requirements for the production of vital war materials increased the use of gas in industrial equipment by 16% over 1942. The many new installations of gas cooking equipment in training camps and war plant cafeterias contributed substantially to the 4.3% increase in commercial gas sales over the preceding year. The problems of quickly applying industrial gas to war production and commercial gas to Army and Navy bases had to be solved and there was no easy method. That our industry has successfully met this challenge to date is an achievement in which every one concerned may be justly proud.

No one has to be told that there is hardly a factory, mill, or shop on this continent that has not been converted, either wholly or in part, from peacetime manufacturing to hard driving, twenty-four-hour-a-day production of the thousands of articles used in such tremendous quantities for war. No one in the gas industry has to be told of the great installations of gas cooking, baking, water heating and cantonment heating throughout the country, that have played such an important part in building up millions of strong and alert bodies for the Army, Navy and Marine Corps. Also, everyone is familiar with the entirely new scale on which gas has met its duty and its opportunities in cooking good meals, around the clock, in war production plants. And, finally, it is common knowledge that gas equipment in restaurants, hotels and hospitals is being used to its full capacity. We in the industry are fully aware of these facts, and are determined to learn new things and develop new opportunities from them.

•

To meet fully the impact of war and to expand our part in war production and mass feeding, required an all-out effort on the part of industrial and commercial gas engineers and equipment manufacturers that has never been matched before. Millions of dollars of new natural and manufactured gas equipment had to be installed in the

Address of the Chairman at the 1944 A. G. A. War Conference on Industrial and Commercial Gas, Rochester, N. Y., March 30-31.

workshops and in the great kitchens that are a part of the war machine. Engineering problems, on a scale never before faced, had to be solved quickly and in vast numbers, and they had to be solved *right*. Old processes had to be improved and new processes had to be devised and perfected. The specifications for each intricate part of every piece of war supplies are tougher than ever before and no seconds can get by, when lives depend upon the quality of heating that goes into its manufacture or preparation.

During the past year the huge building program for new industrial plants and the conversion of old plants was essentially completed and in 1944 every effort will be directed toward reaching the absolute maximum of daily capacity. Industrial gas men and equipment manufacturers are regularly working at top speed to help keep apparatus working at its highest efficiency, and will, of course, continue to do so until the war is won.

Reconversion Program

The changing conditions in combat zones will dictate new strategies which, in turn, will necessarily affect the types and quantities of this year's war material production. Already, some manufacturing capacity is becoming available because of cutbacks, cancellations and non-renewal of orders. Thus, partial reconversion from war production to the manufacture of civilian products becomes a possibility in many factories. How much of our present capacity may be reconverted hinges upon our success in the European war theatre. The plan, now, is to release some materials for the manufacture of essential civilian products to plants in areas where manpower is sufficient and where such reconversion will not interfere with any vital part of the war program. Therefore, it is also significant that this War Conference comes at a time when plans for the vast reconversion job, as well as plans for the competitive postwar period, are in the making.

We will eventually face the gigantic task of reconverting back to peacetime manufacturing, the great production plant industrial gas has helped to create. The various war agencies are approaching policy decisions which, once made, should result in the easing of restrictions as fast as materials and manpower situations permit. To help chart our course from here on, we should closely follow the varying military requirements which in some cases will expand and in others show a definite curtailment. A study of these changing demands will help determine:

(1) Where and what kind of gas equipment will be needed.
(2) Where its use may be discontinued.
(3) Where and what kind of industrial plant reconversion may take place.

We also face the task of completely rebuilding or replacing numberless food service installations that are giving their utmost to feed a hungry nation that is over-taxing every hotel, restaurant, lunchroom and industrial cafeteria in the land. It is timely to note that already the equipment and competitive phases of the commercial cooking load have been carefully studied and that factual surveys are being undertaken to determine what steps should be taken toward strengthening and improving our position in this important field.

We do not know when we will be able to swing into action to accomplish these tasks, but we do know this: In some respects the task will be far greater than was that of building and altering equipment for war production plants, and of equipping Army and Navy bases and war plant cafeterias, for cooking food for the fast growing military personnel and the mass of war workers.—The reason? First, the necessity for selling industrial and commercial gas and gas equipment on a basis that will make money for the purchasers. Second, competition.—These two paramount conditions were not fully present in a war economy that was featured by scarcity of materials and manpower, by government financing of new equipment, and by government purchase of all that those plants could produce. Nor could they be present while patriotism was exerting its strong influence toward cooperation between those who are normally rivals in selling. When these forces are no longer controlling, industrial and commercial gas will suddenly face its great challenge. That challenge can defeat us or it can be turned into opportunity.

In facing the future, we are better prepared by the vast experiences gained through four years of preparedness and war production. These experiences are being analyzed and catalogued for future use. The quick and successful solution of unusual engineering and research problems under war pressure has given new strength to our industry. The time is coming when that experience must be translated into dynamic tools for action in meeting the engineering problems of reconversion. We are promised new materials, new uses of old materials and new designs of products to conserve critical materials. Production equipment will have to be changed to meet these new processes and methods. With sound and advanced engineering, the economic and competitive problems of reconverting and rehabilitating industrial and commercial gas installations, from the largest to the smallest, can and will be met with the utmost confidence.

Domestic Gas Research Bulletins Published

TWO more bulletins, resulting from the accelerated program of fundamental research being conducted by the American Gas Association at its Testing Laboratories, are now available to those interested. Covering special phases of domestic cooking and burner research, their initial distribution was recently completed.

The first, "Single Point Flash Tube Ignition of Oven and Broiler Burners," is known as Research Bulletin No. 21. The fifth of a series on domestic gas cooking, it is a sequel to Bulletin No. 17 which presented a comprehensive study of the fundamentals of flash tube oven ignition using manufactured gas. The new bulletin extends the study to the field of natural gas, the ultimate goal being design of flash tubes providing effective ignition with natural, mixed and manufactured gases.

The second bulletin, "Primary Air Control Devices for Atmospheric Gas Burners," is designated Research Bulletin No. 22. It is the fifth of a series on burner research. It presents extensive data covering studies of different means of controlling primary air injection with Bunsen burners and tests made to determine the relative merits of various types of primary air adjustment devices in resisting reduction of initially regulated air-gas mixture ratios as a result of dust and lint stoppage.

Both bulletins were prepared and approved under the sponsorship of the Committee on Domestic Gas Research of which Everett J. Boothby is chairman and F. M. Banks, vice-chairman.

Introducing the New Employee to the Job

By WILLIAM M. MUSSMAN
Director of Educational Work, Public Service Electric and Gas Co., Newark, N. J.

THOSE who are responsible for the formulation of personnel policies have recognized the necessity for getting the new employee off to the right start. Recognition of this necessity involves acknowledgment of some fundamental principles:

1. Many individuals lack confidence in themselves. This lack of confidence is natural in the face of new work, new people, new surroundings and new rules, regulations and customs.

2. To meet every individual's desire to work for an employer in whom he has confidence, the company has a selling job to do. Its attitudes and policies will not be known unless they are sold.

3. While first impressions may not be reliable, they are usually lasting. The new employee's attitude is influenced by his early experiences and that attitude often becomes permanent.

Out of these concepts there have been developed various aids for introducing the new employee to the job: letters of welcome, entrance training groups, sponsor systems, employee manuals or handbooks, and others. These are useful tools, but in the last analysis it is the supervisor who must bear the principal responsibility. It is he who has the ultimate duty of seeing that the new employee becomes oriented to the job and its detailed requirements, to the other employees, to the prescribed standards of conduct, and to the broader company structure, policies and opportunities. It is important, of course, that the supervisor be given every practical aid in carrying out his responsibility.

The Planned Approach

The induction program that is summarized here represents an effort to coordinate some existing practices and supplementary induction aids into an organized plan. The plan was developed from a re-examination of present practice, under the direction of the Committee on Educational Work.

In the program, a number of supplementary aids are used. None of these is substantially new or different. By re-examining the procedure, however, it has been possible to allocate properly spheres of responsibility and plan the approach to the problem of introducing the new employee to the job.

The Initial Interview

During the initial interview of an applicant for employment, the process of introducing him to his job actually begins. The employing officer, at that

PUBLIC SERVICE

OUTLINE

INTRODUCTION OF NEW EMPLOYEE TO THE JOB

WHEN	WHAT AND HOW	BY WHOM
FIRST DAY		
1. ON ARRIVAL AT OFFICE	1. INTRODUCTION TO SUPERVISOR	1. BY PERSON WHO DID HIRING
2. ON ARRIVAL IN DEPARTMENT (15 MINUTES)	2. INFORMATION NEEDED IN DAILY ROUTINE (A) WHERE TO LEAVE HIS HAT, COAT, ETC. (B) ANY INFORMATION HE MAY NEED ON GETTING TO AND FROM WORK, TRANSPORTS FACILITIES, ETC. (C) STARTING TIME, LUNCH PERIOD, QUITTING TIME (D) WHEN, WHERE, AND HOW HE WILL BE PAID (E) OPPORTUNITY FOR QUESTIONS	2. SUPERVISOR
3. FOLLOWING PRELIMINARY INTERVIEW (½ HOUR)	3. MEETING OTHER WORKERS, GETTING TO KNOW LAYOUT OF BUILDING (A) TRIP THROUGH DEPARTMENT WITH GENERAL EXPLANATION OF DEPARTMENTAL FUNCTION (B) SHOW HIM WHERE HE IS TO WORK AND MEET NEIGHBORING WORKERS (C) EXPLAIN ANY SPECIAL RULES ON SMOKING, LEAVING DEPARTMENT, SAFETY—FIRE AND AIR RAID REGULATIONS, DISPENSARY OR FIRST AID FACILITIES (D) LOCATION OF WASH AND REST ROOMS	3. SUPERVISOR OR ASSIGNED KEY EMPLOYEE, PARTICULARLY IN CASE OF WOMEN
4. FOLLOWING NO. 3 (TILL NOON)	4. JOB INSTRUCTION	4. SUPERVISOR OR PERSON ASSIGNED TO DO TRAINING
5. NOON	5. SHOW LOCATION OF LUNCH FACILITIES (A) CAFETERIA, OR OTHER PLACES (B) RECREATIONAL FACILITIES, IF ANY (C) INTRODUCE TO OTHER EMPLOYEES	5. PERSON DESIGNATED BY SUPERVISOR
6. AFTERNOON UNTIL ½ HOUR BEFORE LEAVING	6. JOB INSTRUCTION	6. SAME AS NO. 4
7. ½ HOUR BEFORE LEAVING	7. DISCUSS OTHER GENERAL PROCEDURES, REGULATIONS, AND POLICIES (A) HOURS PER WEEK, CERTIFICATE OF HOURS WORKED, OVERTIME COMPENSATION (B) ABSENCES, WHEN AND WHOM TO CALL (C) PAYROLL DEDUCTIONS—SOCIAL SECURITY TAX, UNEMPLOYMENT INSURANCE, VICTORY TAX, PURCHASE OF WAR BONDS (D) REPORTING ACCIDENTS, INCLUDING TRANSPORT (E) ENTRY TO COMPANY BUILDINGS AFTER HOURS (F) HOLIDAYS (G) VACATIONS	7. SUPERVISOR
SECOND DAY AT A CONVENIENT TIME	REVIEW RULES, REGULATIONS, AND POLICIES (A) TO SEE THAT HE UNDERSTANDS (B) TO GIVE OPPORTUNITY TO ASK QUESTIONS (C) COMPANY'S CUSTOMER RELATIONS	SUPERVISOR
WITHIN FIRST WEEK	INFORMATION ABOUT THE ORGANIZATION (A) EXPLAIN ORGANIZATION (B) TRIP TO OTHER DEPARTMENTS OF THE OFFICE (C) COMPANY WELFARE PLAN (D) EDUCATIONAL PROGRAM (E) LIBRARY (F) PUBLIC SERVICE NEWS (G) SUGGESTION PLAN (H) DISCOUNT ON ELECTRIC AND GAS APPLIANCES	SUPERVISOR
AT THE END OF FIRST WEEK	INTERVIEW WITH SUPERVISOR (A) FIND OUT WHAT HE IS THINKING (B) CLARIFY ANY MISUNDERSTANDING (C) GIVE OPPORTUNITY FOR QUESTIONS	SUPERVISOR
AFTER 3 TO 6 MONTHS	GENERAL TRAINING (4-DAY CLASSROOM WORK)	EDUCATIONAL DEPARTMENT

Figure 1

PUBLIC SERVICE

CHECK LIST

INTRODUCTION OF NEW EMPLOYEE TO THE JOB

EMPLOYEE'S NAME DATE EMPLOYED	INFORMATION GIVEN BY	DATE
1. DOES HE KNOW WHERE TO LEAVE PERSONAL PROPERTY?		
2. HAS HE BEEN INTRODUCED TO FELLOW EMPLOYEES?		
3. DOES HE UNDERSTAND HOURS? (A) STARTING AND QUITTING TIME (B) LUNCH PERIOD (C) WORK WEEK		
4. DOES HE UNDERSTAND METHOD OF COMPENSATION? (A) TIME (B) PAYMENT BY CHECK (C) PLACE AND BY WHOM (D) POLICY ON CASHING CHECK (E) PAYROLL DEDUCTIONS (F) OVERTIME		
5. DOES HE UNDERSTAND OFFICE RULES? (A) SMOKING (B) LEAVING THE DEPARTMENT (C) CONDUCT IN CONTACTS WITH OTHER DEPARTMENTS (D) SAFETY (E) FIRE OR AIR RAID DRILL (F) ENTRY TO COMPANY BUILDINGS AFTER HOURS (G) REPORTING ACCIDENTS (H) ABSENCES—WHEN TO CALL AND WHOM		
6. DOES HE KNOW OFFICE LAY OUT? (A) WASH AND REST ROOMS (B) OTHER DEPARTMENTS (C) PROPER ENTRANCE (D) RECREATIONAL FACILITIES (E) LUNCH FACILITIES		
7. DOES HE UNDERSTAND WELFARE PLAN? (A) PENSION (B) GROUP INSURANCE (C) DEATH BENEFIT (D) PAYMENT OF SALARY WHEN SICK		
8. DOES HE KNOW ORGANIZATION OF OFFICE AND DEPARTMENT? NAMES OF SUPERVISORS?		
9. DOES HE KNOW FUNCTION OF THE DEPARTMENT THE OFFICE THE BUSINESS?		
10. IS HE FAMILIAR WITH COMPANY EMPLOYEE ACTIVITIES? (A) LIBRARY (B) EDUCATIONAL PROGRAM (C) PUBLIC SERVICE NEWS (D) SUGGESTION PLAN (E) DISCOUNT ON ELECTRIC AND GAS APPLIANCES		
11. DOES HE UNDERSTAND WHERE TO GET INFORMATION OR HELP?		
12. LETTER FROM COMPANY EXECUTIVE SENT?		
13. ASSIGNED TO GENERAL TRAINING		

Figure 2

time and on the employee's subsequently reporting for work, will impart general information about the company, the type of work to be done, working conditions, and opportunities.

Promptly after employment, an executive of the company writes a letter of welcome to the new employee at his home address. The executive follows this up by arranging to meet the employee at the earliest opportunity.

To assist the supervisor in carrying out his responsibility, an outline, setting forth the detailed steps, has been utilized. (Figure 1). This outline, which is printed on card stock, is furnished to each supervisor.

The detailed planning of the items covered in the outline was made with the following objectives in mind.

1. That it is first necessary to determine what information is needed by the new employee. Unless this is done, something will be omitted.
2. That it is necessary to plan the chronological sequence that will best assist him through various phases of his adjustment. Some items of information must be covered at the outset; other matters, although important, need not be discussed immediately.
3. That it is necessary to plan suitably sized units of information. It is difficult for the individual to absorb information properly if a discussion is too prolonged or covers too much ground. Similarly, confusion results if the discussion jumps from one unrelated topic to another.
4. That, in accordance with the same principle, it is desirable to space discussion through the introductory job training period as illustrated by the outline.
5. That it is necessary to make provision for review and general discussion. The objective is not only to make sure that information is given but also to verify that it is understood and retained. In addition, making review part of the procedure gives the supervisor an opportunity for getting to know his employee and how he thinks.

The General Training Program referred to in the outline is conducted for employees on a centralized basis. It consists of 24 hours of classroom work spread over a four-week period. The content of the program includes: practices and procedures in related departments of the company, history of the company and the industry, customer relations, and fundamentals of finance and rates.

This program may be considered as a final step in the induction of the new employee. Experience has indicated that the content of the program may best be absorbed after the employee has made the initial adjustment and is able to grasp the wider range of material presented. Again, the opportunity is taken to review items of information already given earlier in his induction.

Check List

As an aid to management in following through to see that the program has been carried out, a check list (Figure 2) is used. After being used for that purpose, it may serve as a useful personnel record on some later occasion.

The outline and check list have proven useful as guideposts. Individuals in management and supervision have long used check lists of one sort or another to aid their memory; so it is perhaps natural that such a device is especially valuable in a field where the possibilities of omission are so great.

The plan affords sufficient flexibility while retaining fundamental requirements. As changes occur, variations may be made in the outline. New aids, such as employee booklets or handbooks, may be fitted into the procedure. In fact, such materials should become more useful than heretofore, since supervisors who have the responsibility for introducing the employee to the job and who use a planned approach can make such aids effective.

Utility Safety—Today and Tomorrow

By WALTER C. BECKJORD

Vice-President and General Manager, Columbia Gas & Electric Corporation

Walter C. Beckjord

BECAUSE working safely is an essential part of all jobs and affects every individual in our companies, the work of accident prevention is something vital to every one of us and to every employee. Because of the huge economic loss involved, the human suffering, the loss of time and the interference with production, particularly in these times, accident prevention work comes high on the list of essential activities in every company, now and in the future. It is a phase of company operations which should and must receive the serious consideration of management.

Executive Interest Essential

Top executives must have an honest interest in the work and the determination to see that results are forthcoming. The first step in active accident prevention work is to provide leadership. It requires the real interest of the chief executive of a company to set up enthusiasm in an organization. He is a busy man and can delegate detail and some of the work, but if accident prevention loses his dynamic inspiration, you might as well call it off and save the expense. The top executive must honestly believe in safety work and has to make his associates do so in order that the message may go forcefully to every one who may be exposed to risk.

It is universally true that what an organization stands for is usually the reflection of the attitude of one man or the group of men who guide the destiny of a company. Unless they have the proper attitude, the high principles of service and honesty of purpose, the organization is bound to reflect this lack in slipshod methods of doing business and carelessness which can lead to only one result and that is wasteful and careless operation. Safety and accident prevention are among the most important problems of management. These cannot be left to chance nor to subordinates who do not carry sufficient weight to make their influence felt in the organization. If accident prevention work is worth doing at all, and it is most vitally so, it is absolutely essential for top management to give it their careful, well-considered attention, because once the morale on this point starts to slip, it is all the more difficult to get it back on the high plane where it belongs.

It cannot be emphasized too strongly that well-designed company organization, clear lines of responsibilities, and high caliber and well-trained executives with carefully thought out and clearly defined company policies are the basic and most important elements bearing upon the problems of accident prevention. If these phases of management are good, then the lesser functions bearing more directly upon accident prevention will also be good and work directed at reducing accidents will be most effective.

Top men should take the time at frequent intervals to have meetings with key men at which time questions of safety and accident prevention could be discussed in more complete detail, in addition to manifold operations in the continual guidance and operation of a property. These contacts are absolutely essential for executive understanding of proper management, and certainly if this is done safety will get its proper place in operations.

Safety begins with the thinking of the top executives, with the planning of operations and with the design of plant and equipment. Where is a better place to prevent accidents than on the drafting board or in the drawing up of work schedules and operating procedures? It is so much more beneficial to prevent hazardous conditions than forever trying to teach people to watch out for them. Safety thinking is of great value and when applied to the fundamental problems of design and operations the benefits are large and continually forthcoming. In other words, all persons who participate in the engineering, management and operations of a company bear a real responsibility for safe conditions.

When all is done to make equipment and working conditions as safe and foolproof as possible much has been done to prevent accidents, but in the last analysis it is up to the individuals on the job to work safely.

Importance of Foreman

We all know the importance of the foreman in preventing accidents. It is in his reflection of management policies that the best work on safety and accident prevention work may be done. Unless the foreman is definitely sold on safety and preaches it as his daily routine, takes it seriously and with the proper attitude, all the safety talk in the world will not accomplish much good. The men soon learn to know whether the foreman takes a dignified, firm attitude on these matters or whether he is willing to let things slide in order to get a few moments' time. Once they find he is firm in his purpose to do right under the proper safety precautions they will abide by that decision. The foreman's attitude is the reflection of the thinking of the superintendent, and the attitude of the superintendent comes from top management.

Accidents of various degrees of seriousness happen to every one of us even though we have knowledge of their cause and effect. Knowledge is helpful in preventing accidents only when it is used. When safe reactions take place unconsciously then we say such action or reaction has become a

Part of paper presented at Detroit Industrial Safety Council, Detroit, Michigan, April 5, 1944.

habit. Through training of the mind in one way or another the individual has developed a safe working habit under such conditions. Herein lies the value of training and I believe the earlier a person develops the habit of doing things safely in his daily life the better chance he has of avoiding accidents both on and off the job.

Safety effort must have some sparkle, some drama of itself or it may be pretty dull. Originality of plan, of education and demonstration will bring interest. You, who are actively in safety work know all about these problems of training and selling the idea of safety. I am merely confirming what you already know and what you are doing. I want to encourage you to continue to use your imagination and leave no avenue uncanvassed that may prove another way and perhaps a better way to get the safety habit instilled into people's minds and every action.

Utility Operational Hazards

It is thought by some that operations of the utilities are hazardous, but this is not necessarily the case. Many of the accidents are not directly of the type that result from the production and distribution of gas and electricity, but are rather common to all industries.

Lost time in our industry is affected greatly, as is every other industry, by accidents off the job. Off-the-job accidents often occur more frequently than occupational accidents. Time lost by these accidents away from work is just as much a loss and the disturbing effects at the plant and on the family of the injured are just as bad as getting hurt at work. Safety must be practiced off the job as well as on the job. The work of accident prevention should be and is a universal one and must be attacked from every possible effective angle.

In the public utilities we feel we are doing a good job of preventing accidents and measured by earlier records we are. But the facts are that each year some 150 men are killed in the electric and gas industries and that the rate of fatalities per 1,000 employees per year has remained almost constant over the last ten years, the electric record somewhat higher than that of the gas. The record for the year 1942 showed that the electric industry lost 129 men and the gas industry 29 killed and permanently disabled. The fatalities per 1,000 employees was .51 and .28 respectively for the electric and gas industries.

This situation shows that in spite of all that has been done, in spite of the safety organizations, safety engineers and the millions of words that have been spoken and written, our industry still pays a heavy toll and the trend shows little or no tendency of improvement. Such a situation indicates that past and present efforts are effective up to a certain point. Now is the time to renew this effort and if possible devise means of making this effort more effective. Here again, I wish to emphasize the part executives will have to take in accident prevention work if further progress is to be made.

Pressure of War

During these war years our organizations have been undergoing drastic changes. The increased loads and the constant drawing off of manpower has placed tremendous burdens on the remaining and older superintendents, supervisors and foremen. Too much credit cannot be given to these men who have shouldered extra responsibilities and solved their problems under the drastically changing conditions. The safety record of most is outstandingly creditable when all is taken into account. We can be thankful our losses are no greater than they are, but we can take no comfort in the fact, for the fight to improve the record is growing more difficult.

As war requirements lessen, there will be a great increase in maintenance and construction work. New men will come from other industries and from the returning armed forces. The possibilities for accidents will increase as the war ends and during the post-war period. Driving conditions, no doubt, will be extremely hazardous as soon as gasoline is made available. The millions of old cars and millions of inexperienced drivers, both young and old, will all contribute to the accident toll. With the ending of the war, the whole country will experience a letdown period and the tendency to relax and let things slide will be a dangerous condition to contend with. The whole period of readjustment will tax the ingenuity of all safety thinking and working people. Now is the time to think of these problems and get organized to combat the forces which we know are going to affect greatly the safety working of our employees and every one of us.

If we are going to improve our safety records, we must sit down and analyze as best we can the problems that lie ahead and plan how we are going to meet the new conditions and organize our effort in the most effective manner. If we are really serious about improving the record, and we are, then we should set a goal. Within the next five years, the accident rate should be cut, let us say, to one-fifth of the present rate. The total annual death rate due to accidents is still 95,000—far too many.

It is very easy to talk about these things and what we ought to do in safety work, but it is not easy to extend our effort to the point of getting something accomplished. The problems of analyzing and planning a program of procedure that will be most effective and productive is not an easy task or one that can be done on short notice. It is important that we extend our thinking into the future as far as possible and make our plans accordingly, based, of course, on our past experiences. One of the difficulties in safety work is the fact that results must so often be reported negatively.

Positive Approach Needed

As important as accident analysis is, it is also important to think and analyze our problems in a positive sort of way. For example, I believe that the accidents will increase greatly with the return of gasoline. The American people are probably the most travel-loving of all peoples in the world and have the means of transportation in a large country covered with a network of fine highways. It seems only logical that we should think of the hazards that lie ahead of the millions of new and old cars that will be again upon the roads. These conditions will not only affect us when we are off the job, but will greatly increase the hazards of all our employees driving automobiles, even though our cars are properly maintained and our drivers carefully trained. This is just one example of foreseeing what is ahead.

The responsibility of management and executives up the line enter at every turn in the discussion of safety

and accident prevention. We certainly cannot expect the busy superintendents and foremen to do all the thinking—they have their full jobs to do in carrying out their daily work. However, they can and do contribute greatly with their practical knowledge and experiences under actual working conditions. It falls upon the men higher up who must either have time or take the time to think these problems through. To be sure, the demands are great upon executives and their time is limited. On the other hand, this is no excuse at all for management not to consider properly and direct the work of the safety phase of operations in a company. The question is one of company organization. A company cannot operate effectively unless it is adequately manned, not only down the line, but at the top, and safety in operations is fully as important as the routine problems of production.

Training Key Men

The selection and training of key men in an organization is a very important one and I wish only to mention briefly its importance here. I believe it pays real dividends to develop foremen and supervisors in so far as their capacities will allow and share as far as possible the responsibilities of operations in accordance with their capacity. Their position in actual operations places them in position to quickly diagnose troubles and apply remedies on the spot without delay. If they are thoroughly schooled in safety principles and are encouraged to do the best kind of job and given some authority to take individual action, a great many minor problems will never reach major and serious proportions. This plan develops and strengthens the whole organization and builds men more quickly and assures safe working practices. This fact is of particular importance when operations are widespread over much territory as they are in the public utility business. It may seem a little academic to list the attributes required by men in supervisory positions whether they be foremen or superintendents but I would like to just touch upon them briefly, for I think they are fundamental in thinking upon this problem. They are as follows:

Leadership
Knowledge of the job
Ability to instruct
Ability to organize
Good judgment
Knowledge of company policies
Initiative
Ability to analyze
Intelligence
Ability to follow through

In this list of qualifications, you see there has been no direct reference to safety. The fact of the matter is that safety is an integral part of every one and unless it is, the attribute is deficient. In other words, essential qualifications of a man in any supervisory position includes the appreciation of the importance of safety and the ability to incorporate safety thinking in every thought and action.

So far, I have spoken mostly on the broader problems of accident prevention and now will touch briefly upon our experiences in safety work in the Columbia System which has normally about 15,000 employees.

Columbia Safety Record

Our safety record was a pretty sorry one in the 1930's. Accidents were not only of regular, but of all too frequent occurrence; deaths were not uncommon; in fact, we had supervisors who told us we could not do certain types of construction work without killing or maiming some of our employees. This was typical of the way some of our people felt about accidents at that time. Hundreds of accidents each year caused much suffering, loss of life, and the tremendous costs, all affecting the worker, the company, the rate-payer and the investor.

In 1936 our frequency rate was 13.35 per million hours worked, or one accident for every 75,000 hours worked. We could not subscribe to the view that most of these accidents were unavoidable and we set out to lessen them. From 1936, with a 13.35 frequency rate, we have steadily improved our experience, until today, and in spite of longer hours, heavier responsibility and greater working tension, our System frequency rate is less than half of what it was in 1936. It now being around 6.40, or one accident for every 156,000 hours worked. Some of our companies have even lower rates, the best being down to a rate of 2.3 in 1943.

We endeavor to keep abreast of the times with respect to our safety work. We try to impress upon our supervisors the need of eliminating unsafe conditions as rapidly as they are discovered; the necessity of installing machine guards, providing safe and adequate tools; seeing that our employees are properly trained; stressing the importance of proper illumination, good housekeeping, etc.

We are making special effort toward continually pointing out the unsafe acts of the individual and publicizing them for the benefit of all. I am satisfied we have come more nearly putting all employees on guard against accidents by this method than through any other single step we have taken.

We endeavor to run every single accident to the ground. Your own records, as well as ours, will clearly indicate that many of the reasons given for accidents are merely excuses, sprinkled with a liberal amount of buck-passing. We try to get at the real meat of the problem, that is, to debunk the explanation given for the accident and to find out really what was wrong—*who* was wrong and *why*.

Challenge of the Future

A most challenging job of preventing accidents still lies ahead, even though we have come far along the road and accomplishments have been outstanding, particularly in industry during these war years with the increased hours of exposure. As rich as this nation is, it cannot afford either in war or times of peace the tremendous loss of man hours (370,000,000 charged), and a total cost to the nation of an estimated amount of five billion dollars.

With all due credit to the work that has been done in the public utility industry, the fact is that we lose 150 men each year that might otherwise be saved; to say nothing of the thousands of injuries and resulting effects upon our companies and services to our customers. In public utilities the trend of accidents in the past ten years has been almost at a level rate which shows that in spite of the increasing effort on this phase of operations, improvements have been slight, at best. This condition necessitates increased effort on our part and particularly on

(Continued on page 232)

Immersion Tubes... *Gas Research Discloses Basic Performance Characteristics*

Fig. 1. Atmospheric and open type pressure burners, eductors and miscellaneous burner equipment used in immersion tube burner studies

By WILLIAM R. TELLER

Chief Research Engineer, American Gas Association Testing Laboratories

FOR the past two years the American Gas Association through its Committee on Industrial Gas Research has been investigating at its Testing Laboratories basic performance characteristics of gas immersion tubes. This method of gas heating has been adapted to numerous commercial and industrial heating processes with considerable success. However, lack of published technical data on this subject has hindered to some extent a more rational and convenient approach to engineering such applications for predetermined heating requirements, and for high standards of thermal efficiency and other performance characteristics.

During this investigation certain definite empirical relationships involving heat transfer characteristics of gas immersion tubes were developed. Those applicable to immersion tubes suitable for industrial heating purposes will be discussed in some detail. In addition, results obtained on overall performance characteristics of commercial deep fat fryers embodying gas immersion tubes will be presented, together with data on experimental fryers.

In any installation of industrial gas immersion tubes there are generally two primary design considerations which must be given appropriate attention. The more important of these is probably the requirement that the gas burning capacity and heat transfer characteristics of the immersion tube should be such as to bring the heated medium up to temperature within a desired time limit and to provide adequate pick-up or recuperation upon adding load. Coupled closely with this requirement is the necessity of performing the work economically insofar as gas consumption is concerned. Collateral considerations in design and installation of industrial gas immersion tubes are that they should operate without excessive noise, that combustion should be complete, that the diameter of the tube should be adequate for the designed gas rate, and that the temperature and safety control equipment should function properly to insure safe and satisfactory performance.

Fig. 2. Open pressure burner and eductor assembly connected to "U"-shaped immersion tube. Test assembly at left was used for small diameter immersion tubes

Fortunately, all capacity and thermal efficiency data obtained during this investigation* could be closely correlated by a single relationship, involving only the length of the immersion tube (water-backed) and the input rate. It may be expressed as:

$$E = 20 \log \left(\frac{L^2}{R}\right) + 71 \qquad (1)$$

Where:

E = thermal efficiency, %
L = effective length of tube, ft. and
R = input rate, 1,000 B.t.u. per hr.

On the basis of equation (1) recommended data in Table 1 were assembled. These are premised on the assumption that the immersion tube designer would have calculated the required hourly heat output from the tube or, as a corollary, the required hourly heat input into the medium being heated. Hence, length of immersion tube necessary for a predetermined heating requirement is given in Table 1 and is related to efficiency of heat transfer expected and the appropriate gas input rate. Recommended lengths have been verified for nominal tube diameters of ¾ to 6 in. and effective lengths from about 4½ to 45 ft.

Maximum gas input rates which may be attained with satisfactory combustion in immersion tubes depends principally on type of burner installed.

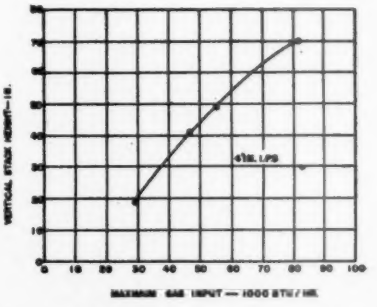


Fig. 3. Effect of stack height on maximum input obtainable with atmospheric immersion tube burners

Presented at 1944 A. G. A. War Conference on Industrial and Commercial Gas, Rochester, N. Y., March 30-31, 1944.

* Data obtained for pipe sizes of ¾ to 6 in. I.P.S. for tube lengths of about 4½ to 45 ft. for atmosphere, open pressure and sealed-in pressure burners, for flue eductors, for water-backed tubes (212 F.), and for 20% excess air in the flue gases.

Several of the burners employed in this investigation are illustrated in Fig. 1. When sufficient external energy is supplied with pressure or eductor burner systems there is no reasonable limitation on the input rate per sq.in. of internal pipe surface area which can be reached. For this reason no attempt was made to evaluate quantitatively the various factors limiting gas input rates. However, a list of the maximum inputs employed in various tests is presented in Table 2 to provide a qualitative basis for estimating the range of input ratings that could be utilized with different type of burners. For open pressure type burners in 2½ and 4 in. tubes, the input rates tabulated approached closely the maximum that could be employed without excessive heat loss at the entrance of the tube.

The greatly increased input rating that can be attained by the use of a sealed-in type pressure burner is illustrated by the comparative ratings obtained in a 2 in. tube (279,000 vs. 52,100 B.t.u. per hr. with the open type pressure burner). Similar increase in input rating may also be obtained by the use of eductors attached to the outlet of the immersion tube as shown in Fig. 2.

Atmospheric burners were found to have low limitations on maximum rates. In Table 2 it will be noted that in 2½ and 4 in. tubes capacities of atmospheric burners were less than half that obtained with open type pressure burners and this was possible only in tubes of relatively short length and with use of 7 ft. vertical risers to provide adequate draft. Influence of stack height is shown quantitatively for a 4 in. immersion tube in Fig. 3. It is interesting to note that an increase in height of vertical riser of from 20 to 70 in. permitted the maximum input rate consistent with good combustion to be increased from 30,000 to 80,000 B.t.u. per hr.

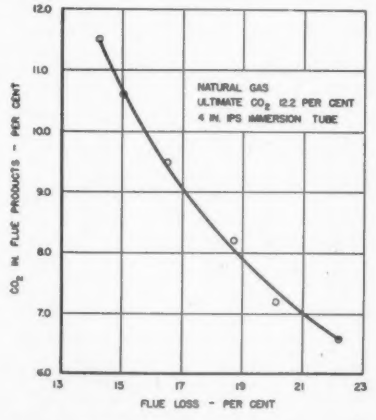


Fig. 4. Relation of flue loss in gas immersion tube heating to concentration of CO_2 in flue gases

During this investigation gas rates slightly in excess of 10,000 B.t.u. per hr. per sq.in. of cross-sectional tube area were completely burned with a tube length of 5.5 ft. and a vertical riser of 7 ft. With a tube length of 10½ ft. and vertical riser of 7 ft. approximately 7,500 B.t.u. per hr. per sq.in. of cross-sectional area was completely consumed. It may be noted, however, that it should be possible to employ input rates per sq.in. of cross-sectional area with atmospheric burners that follow the relationship:

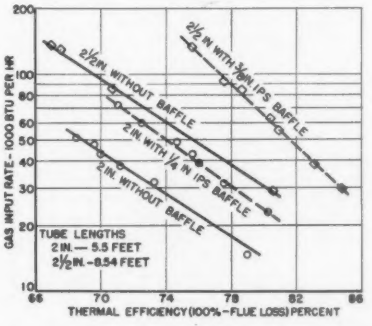


Fig. 5. Effect of baffles on thermal efficiencies of 2 and 2½ in. IPS immersion tubes

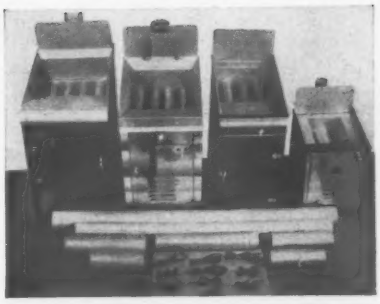


Fig. 6. Deep-fat fryers used in this investigation showing immersion tubes, with different lengths of flue pipe and spiral baffles used with them in foreground

$$5{,}000\sqrt{\frac{10}{L}}$$

Where:

L = effective length of tube, ft.

With open type pressure burners considerably higher input rates per sq.in. of cross-sectional area can be employed. With this type of burner equipment, input rates following the relationship $15{,}000\sqrt{\frac{10}{L}}$ should be

Table 1—Recommended Immersion Tube Lengths* for Required Output Rates at Predetermined Thermal Efficiencies

Output Rate B.t.u. per Hr.	*Effective Length of Immersion Tube Required at Predetermined Thermal Efficiency—Ft.†*					
	Thermal Efficiency and Required Input Rate					
	60%	*Input Rate B.t.u./Hr.*	*70%*	*Input Rate B.t.u./Hr.*	*80%*	*Input Rate B.t.u./Hr.*
10,000					6	12,500
20,000			5	29,000	8½	25,000
30,000			6	43,000	10½	37,500
40,000			7	57,000	12	50,000
50,000	5	83,000	8	71,000	13½	62,500
60,000	5	100,000	8½	86,000	14½	75,000
70,000	6	117,000	9½	100,000	15½	87,500
80,000	6	133,000	10	114,000	17	100,000
90,000	6½	150,000	10½	129,000	18	112,500
100,000	7	167,000	11½	143,000	19	125,000
125,000	8	208,000	12½	179,000	21	156,250
150,000	8½	250,000	14	214,000	23	187,500
175,000	9	292,000	15	250,000	25	218,500
200,000	10	333,000	16	286,000	26½	250,000
250,000	11	417,000	18	357,000	30	312,500
300,000	11½	500,000	19½	429,000	32½	375,000

*Each 90° elbow or return bend is equivalent to 1.1 ft. of straight pipe plus the length of the fitting at its centerline in feet. All effective pipe lengths are water-backed surfaces. Pipe lengths extending beyond the heated medium such as burner cages are not included and must be added to lengths tabulated.

†To nearest ½ ft.

Fig. 7. Four atmospheric immersion burners for deep-fat fryers and one improvised power burner (lower right)

readily attainable with complete combustion. Higher rates may lead to excessive burner cage temperatures or back pressure to the atmosphere.

With sealed-in pressure type burners there seems to be no reasonable limit to the amount of gas which can be completely burned. Apparently, the only limitation to combustion rates with this type of burner would be established when frictional resistance exceeded the power output of the premixing unit.

As in other methods of gas heating, thermal efficiency characteristics of immersion tubes are improved by maintaining excess air at the minimum amount consistent with complete combustion. Effect of excess air is illustrated by the relationship between concentration of CO_2 in flue gases and thermal efficiency of a 4 in. immersion tube shown in Fig. 4. From this it is apparent that any comparative tests on various sizes of immersion tubes is contingent on maintenance of a fixed concentration of CO_2. For this reason the percentage of CO_2 was maintained at 10.0% during all tests (equivalent to 20% excess air). This particular value was arbitrarily chosen to attain a reasonably high thermal efficiency and to provide sufficient excess air for complete combustion over a wide range of input ratings.

Baffles are seldom, if ever, used in immersion tubes of any appreciable size.

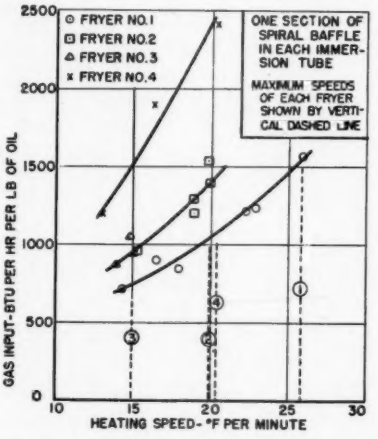

FRYER NO.1
FRYER NO.2
FRYER NO.3
FRYER NO.4
ONE SECTION OF SPIRAL BAFFLE IN EACH IMMERSION TUBE
MAXIMUM SPEEDS OF EACH FRYER SHOWN BY VERTICAL DASHED LINE
GAS INPUT-BTU PER HR PER LB OF OIL
HEATING SPEED- °F PER MINUTE

Fig. 8. Comparison of heating speeds obtained on four representative deep-fat fryers at various gas input rates

Extended heating surfaces on the outside of a tube, obviously, would serve no practical purpose for many applications since the rate of heat transfer† from the flue gases to tube wall is extremely small in comparison to the heat transfer from the metal to water or most other liquids in which the tube may be immersed. If extremely viscous fluids, such as oils, are being heated externally, extended fins may be of some value. Simplicity of immersion tubes as heat exchangers and the ease with which additional heating surface may be obtained in a majority of cases by recourse to additional pipe length would in most installations make it impractical and unnecessary to employ baffles within the immersion tube. However, where the length of the tube is limited, baffles could be used to increase efficiency and output as illustrated by results obtained on 2 and 2½ in. I.P.S. tubes with pipe baffles as shown in Fig. 5. These show an increase in thermal efficiency of from 5 to 6% with comparatively small restriction of the cross-sectional area of the tubes.

One of the principal advantages of

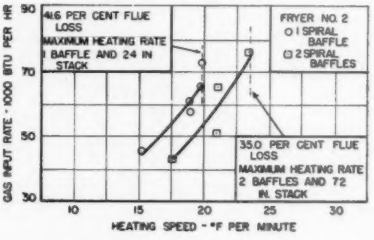

4½ PER CENT FLUE LOSS
MAXIMUM HEATING RATE
1 BAFFLE AND 24 IN STACK
FRYER NO. 2
1 SPIRAL BAFFLE
2 SPIRAL BAFFLES
3.5 PER CENT FLUE LOSS
MAXIMUM HEATING RATE
2 BAFFLES AND 72 IN. STACK
GAS INPUT RATE - 1000 BTU PER HR
HEATING SPEED - °F PER MINUTE

Fig. 9. Increased heating speed obtained with additional baffles at various gas input ratings

gaseous fuel is its flexibility of operation over a wide range of input rates. This characteristic is particularly valuable in immersion tube heating which may be required at times to provide greatly increased inputs to meet special demands. An enormous increase in input rates can be made with a relatively small decrease in efficiency. This is illustrated by the data in Table 3.

As will be noted an average increase in heat output of nearly 170% can be effected with a decrease in thermal efficiency of from 80 to 70%.

Small Gas Immersion Tubes

One of the most popular but comparatively recent applications of immersion tube heating has been in hotel and restaurant deep fat fryers. Immersion tube heating is particularly well qualified for this purpose since it is

† Convection heat transfer for flue gases varies from 0.2 to 5 B.t.u. per (sq.ft.) (hr.) (°F.).
Convection heat transfer for water varies from 50 to 3,000 B.t.u. per (sq.ft.) (hr.) (°F.).
Convection heat transfer for oils varies from 5 to 20 B.t.u. per (sq.ft.) (hr.) (°F.).

Table 2—Maximum Input Rates Employed On Various Sizes of Immersion Tubes

Pipe Diam. Nominal In.	*Type of Burner*	*Length of Tube, Ft.*	*Maximum Input B.t.u./Hr.*	*Flue Gas Temp. °F*	*Burner Cage Temp. °F*
6	Open Pressure	15.0	311,000	995	190
5	Open Pressure	15.18	343,000	1,137	205
4	Open Pressure	14.7	191,000	886	336
4	Atmospheric*	6.41	82,300	1,060	
3	Open Pressure	10.58	150,500	988	151
3	Atmospheric*	10.62	57,600	749	
2½	Open Pressure	9.82	136,400	1,068	322
2½	Atmospheric*	5.92	51,300	1,093	
2	Open Pressure	5.5	52,100	1,011	119
2	Open Pressure 15 In. Vac.	11.04	135,500	853	
2	Sealed-In Pressure	42.77	279,000	201	101
1	Open Pressure 1.33 In. Vac.	11.27	46,200	256	380

*Maximum input rates for atmospheric type burners were obtained with 7 ft. of vertical stack at immersion tube outlet.

capable of providing a cool zone at the bottom of the cooking compartment. This characteristic prevents rapid deterioration of the cooking oil therefore providing more satisfactory and economical performance.

Because of the small overall size of many commercial types of deep fat fryers, the area of the heating surface available with the round tubes commonly employed is somewhat limited. The purpose of this investigation was to determine the possibilities of improving heat transfer rates in deep fat fryer immersion tubes notwithstanding the inherent difficulty presented by limited heat transfer area.

Four commercial deep fat fryers employed for preliminary studies are shown in Fig. 6. Atmospheric burner equipment and one of the improvised power burners are shown in Fig. 7.

The obvious method of increasing heating speed of contemporary fryers would be to increase the gas input rate.

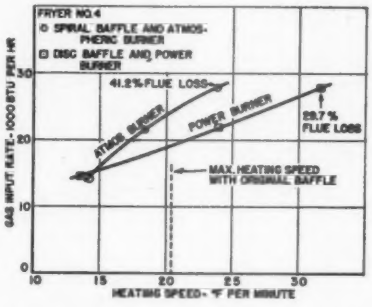

FRYER NO. 4
SPIRAL BAFFLE AND ATMOSPHERIC BURNER
DISC BAFFLE AND POWER BURNER
41.2% FLUE LOSS
ATMOS. BURNER
POWER BURNER
29.7% FLUE LOSS
MAX. HEATING SPEED WITH ORIGINAL BAFFLE
GAS INPUT RATE - 1000 BTU PER HR
HEATING SPEED - °F PER MINUTE

Fig. 10. Comparison of heating speeds obtained with atmospheric and power burners

If input rate is to be increased without sacrifice in thermal efficiency in horizontal immersion tubes, it is necessary to add vertical stack to the flue outlet for adequate chimney effect and to increase baffling at the same time. Increased heating speeds obtained in the four fryers by means of added stack height are presented in Fig. 8. A single section of baffle was used throughout. Data in Fig. 9 show the effect of an additional baffle in fryer No. 2 when stack heights were varied to permit complete combustion at different gas input rates.

There are definite limitations to the extent that heating speed may be increased with atmospheric type burners operating at increased input rates. Maximum heating speeds were approached with stack heights of 7 ft. and it is problematical whether such lengths would be acceptable for field use. Likewise, increased baffling cannot be employed unless vertical stack is added to compensate for the resultant increased frictional resistance to flue gas flow. Two possibilities are presented for increasing heating speeds; namely, use of increased heating surface area or of power burners, either of the pressure or induced draft type. The former alternative involves major changes in design which will be discussed later. The latter, of course, merely requires a change in burner equipment. In order to ascertain potentialities of power burners an improvised multiport burner, as shown in the lower right corner of Fig. 7, was employed in tests on fryer No. 4. This model presented unusual difficulties to improvement in heating speed because of its short tube length and limited heating surface area.

Table 3—Comparison of Heat Output and Thermal Efficiency Characteristics of 4 Sizes of Immersion Tubes at Various Input Ratings

	Gas Input Rate—B.t.u./Hr./Sq.Ft. of Internal Tube Surface		
Tube Size In. I.P.S.	*80% Efficiency 400–500 F Flue Temperature*	*75% Efficiency 700–800 F Flue Temperature*	*70% Efficiency 900–1000 F Flue Temperature*
2	4,700	8,500	15,000
2½	5,200	8,800	14,000
3	4,500	8,500	15,500
4	5,000	8,900	15,500
Average Input B.t.u./hr./sq.ft.	4,850	8,675	14,875
Average Output B.t.u./hr./sq.ft.	3,880	6,500	10,400

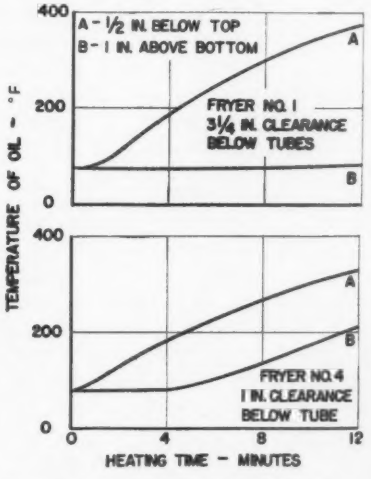

A - ½ IN. BELOW TOP
B - 1 IN. ABOVE BOTTOM
FRYER NO. 1
3¼ IN. CLEARANCE BELOW TUBES
FRYER NO. 4
1 IN. CLEARANCE BELOW TUBE
TEMPERATURE OF OIL - °F
HEATING TIME - MINUTES

Fig. 11. Oil temperature differential in fryers having minimum and maximum clearance between tubes and bottom of crumb receptacle

Comparative results obtained on this unit when operated successively with atmospheric and power burners are illustrated by Fig. 10. From these data it will be observed that a substantial increase in heating speed accompanied use of the power burner. This burner also permitted attainment of a higher thermal efficiency as indicated by the respective flue losses.

These results definitely indicate the possibilities of improved preheating speed performance with power burners. However, their general application by the industry depends on many other factors such as increased initial

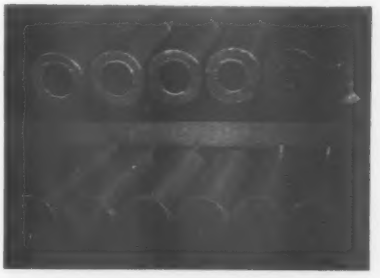


Fig. 12. Heat exchangers and one of the atmospheric burners used in determining effect of baffles and shape of flueways in short immersion tubes

Fig. 13. Top view of experimental model deep-fat fryer with 2 ft. of stack

cost and the use of external motive power. Moreover, temperatures of metal surface exposed to the cooking oil may reach excessive values with consequent rapid oil deterioration if the high heat transfer rates possible with power burners are fully utilized.

There are, in addition to efficiency, combustion and capacity characteristics, two other major performance items of importance in deep fat fryers. These are metal temperatures which should not greatly exceed those of the oil at any time, and oil temperatures at the bottom of the crumb receptacle which should approach room temperature so that deterioration of the oil will not be brought about by continued heating of food particles.

Investigation of the four commercial deep fat fryers revealed a wide variation in metal temperatures. Although numerous observations were made it was not possible to correlate the wide difference between oil and heating surface temperatures for various fryers on the basis of design elements or input rates. Circulation of the oil, heat input and position and type of baffles undoubtedly have some influence on the temperature differential between the oil and metal. However, wide differentials between oil and heating surface temperatures when observed could usually be attributed to high input and heat transfer rates.

Low temperature crumb receptacles were incorporated in all four fryers studied. This characteristic is inherent with the immersion tube type of heating application and the degree of coolness of the oil in the crumb receptacle is apparently a function of the distance between tubes and bottom surfaces of the crumb receptacle. This was shown by comparison of data for the two fryers which had the minimum (1 in.) and maximum (3¼ in.) clearances respectively between tubes and bottom of the crumb receptacle (Fig. 11). It is significant to note moreover that the fryer with the highest crumb receptacle temperature complied with American Standard Approval Requirements thus indicating that very little clearance below the tubes is required to obtain the desired result.

Studies of representative immersion tube type deep fat fryers indicated that any appreciable improvement in heating speed with atmospheric burners could probably only be attained with a sacrifice in thermal efficiency and use of high vertical stacks which may not be acceptable to the industry in general. In addition, flue gas temperatures at the higher input ratings were very high and these might serve to shorten the life of the unit considerably. It appeared therefore that use of increased heating surface areas offered the best possibilities of obtaining greater capacity without sacrifice in thermal efficiency or necessity of resorting to excessively high stacks.

As a preliminary step various sizes of rectangular and circular tubes were constructed and welded into cylindrical containers as shown in Fig. 12 in order to determine effect of shape of tube cross-section on performance of short immersion tubes. Thermal efficiencies of each were determined over a wide range of input rates by regulating water flow through the outer jacket to limit temperature rise to 60° F.

For equivalent heating surface area, it was found that the 2 in. diameter circular tube yielded a greater heat output than the rectangular shaped tubes. As the rectangular shaped tubes were decreased to less than 1 in. in width, input ratings had to be reduced to maintain satisfactory combustion although a special burner adaptable to this shape of tube was utilized. If tubes were individually fired, the 1 in. wide rectangular tube appeared to be the most satisfactory since it permitted use of input and output ratings equal to that of wider tubes and a much higher rating than could be secured with narrower tubes.

Studies were made with three types of baffles; namely, disc baffles 3 in. apart, spiral baffles and longitudinal fin baffles welded to the tube wall. Resultant data indicate that for the short length of tube involved, use of baffles apparently is not particularly effective. Efficiency was increased by the use of these baffles but it was necessary to decrease the input rate to permit complete combustion. The 3½ in. diameter tube with 1 in. wide fin type baffles gave a considerably higher heat output than the other tubes studied, but it would deliver much less heat than two rectangular shaped tubes 1 in. wide and the latter would occupy much less lateral space in a fryer cooking compartment.

Table 4—Comparative Performance of Experimental Deep Fat Fryer and Representative Commercial Model

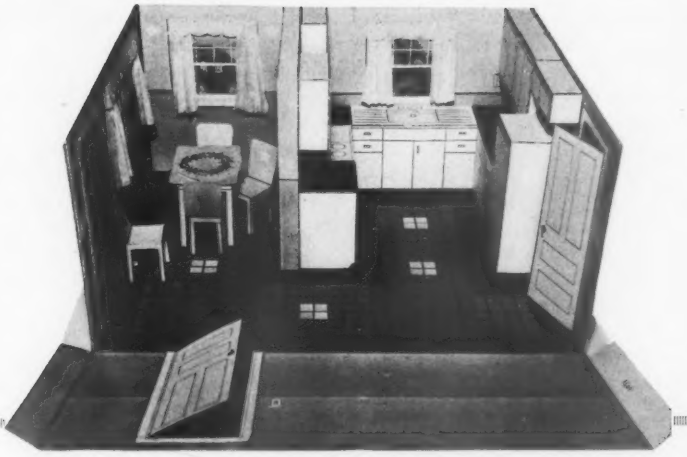
	Gas Input Rating B.t.u./hr.						
Fryer	*Total*	*Per Lb. of Oil*	*Per Lb. of Oil Above Tubes*	*Stack Height In.*	*Flue Gas Temp. °F*	*Thermal Efficiency %*	*Heating Speed °F Min.*
Experimental	50,000	1,390	2,460	24	500	62.7	24.1
No. 1	32,850	814	1,630	6	700	60.0	19.3
No. 1	62,650	1,550	3,112	72	1,095	44.8	25.8

Increase Heating Surfaces

Results of research on optimum shape and baffling for short immersion tubes clearly indicated that the heating surface in deep fat fryers must be increased greatly beyond that of contemporary models to attain marked improvement in heating speed with high thermal efficiency. To determine the possibilities in this direction, a deep fat fryer was designed as shown in Fig. 13. Deep narrow tubes were selected in order to provide a large heating surface and accessibility for cleaning. A single burner with vertical ports with a combustion chamber at one end of the tubes was chosen since it would be more readily adaptable to automatic control with a single pilot and would not be subject to as much difficulty from the standpoint of completeness of combustion.

Heating speed and thermal efficiency obtained on this experimental unit are compared in Table 4 with fryer No. 1 which had the highest heating speed of any of the commercial units studied. It will be noted that comparative data for fryer No. 1 are given at two extreme input ratings. At the lower rating the efficiency approached that of the experimental unit while at the maximum rating approximately equal heating speed was obtained. On the basis of equal thermal efficiency, the experimental unit showed a much higher heating speed. On the other hand, at equal heating speeds the experimental unit was far more efficient. This efficiency was attained without the use of any insulation and unquestionably could be increased by insulating the exposed sides of the combustion chamber.

It is not intended to convey the thought that the design of the experimental unit is the only one that will give improved preheating speed and thermal efficiency results. Rather, this unit was built to demonstrate the improvement in performance that may be gained by employing larger heating surface areas.



Plan Your Kitchen—Now!

By VERNON E. SHEPHERD

Advertising Manager, Central Hudson Gas & Electric Corp., Poughkeepsie, N.Y.

FOR nearly two years home appliances have been off the market. Appliance stores have closed. Many experienced repairmen are in the armed services or have gone to work in war plants. During this time most utility companies have spent a good share of their advertising dollars advising customers as to the steps they might take to help insure the continued operation of their present equipment.

This has been, and still is, good business. Every appliance kept in service means just so much more revenue kept on the lines. But, with all the effort that has been made, it is probable that many appliances have gone out of service. There is a good side to this, too! People have come to realize more strongly than ever before just how invaluable home equipment is. In every city and hamlet, along every country road, markets are being created for after-the-war selling. People have become appliance minded!

But, with the war's end, don't think we are going to have everything our own way. With civilian goods once more available, it's the fellow with the most attractive proposition and the most potent argument who's going to cash in. He may be the automobile salesman, the furniture salesman, or the salesman with this, that or the other thing; but as yet these future salesmen have no work in sight.

They need something tangible in their hands to show and sell. That's where we have a big advantage. We do have something to sell—*an idea with length, breadth and depth.* So, while continuing our efforts to keep present equipment in operation, we think the time has come to start laying the groundwork for future appliance sales for the appliance and equipment dealers in the area we serve.

In our opinion, for some time after the war new building will be at a minimum. We think that modernization of present homes will be the big source of new business. We think that

Building a postwar kitchen—cardboard first; the real thing later

a good many housewives have already made up their minds to do something about their kitchens, or at least about the appliances with which they have to work. If we could place a planning device in their hands realistic enough so that they might actually see their present kitchen modernized, we might reasonably expect to attain three ends: (1) They would see what could be done with their kitchens; (2) an idea would be implanted in their minds; and (3) the completed plan would stay with them as a constant reminder.

With this in mind we set out to devise a kitchen planning manual—the kitchen being the spot in the home where most household appliances are concentrated. We knew that the plan had to be flexible because every woman has pretty definite ideas as to how she would like her kitchen to look. The manual consists of a number of pages of descriptive material plus eight pages of model material printed on heavy cardboard to a scale of ¾ inch to the foot.

Sheet 1 is the floor and side walls. By making two simple cuts the floor plan can be adapted to any size kitchen. Sheet 2 provides for closets, pantries or other projections which may be in the kitchen. On Sheet 3 are a variety of doors and windows to be cut out and pasted in their proper positions on the side walls. Sheets 4 to 8 provide all sorts of appliances, and floor and wall cabinets from which a selection may be made. These are cut out, folded, and pasted together making *three-dimensional* models which may be arranged to suit the worker's fancy.

With the manual, any housewife may plan her kitchen of the future—right now! She may readily see her present kitchen fitted with all manner of new appliances, and floor and wall cabinets. She may work out a color scheme for the whole. With colored crepe paper she may make curtains for the windows and cloths for the breakfast table. Her imagination is the only limit.

Pages from the kitchen planning manual

It's beside the point that when the time comes to do the actual work of modernization she may do the whole job at one time, or a little at a time. She has a plan to follow!

In order to present the manual, a novel demonstration has been put together. One part illustrates the many steps which must be taken in order to prepare and bake a cake in a poorly planned kitchen. Another part deals with the transformation of a dull, drab kitchen into a kitchen of shining beauty. At the present time demonstrations are under way in a number of Home Economic classes in city high and rural central schools, approaching the parents through the students. Other demonstrations are in process of preparation for women's clubs, granges and similar organizations.

Kitchen planning is a natural tie-up with the sale of United States War Bonds. War bonds bought now are truly an investment in the future. Now they are being bought to save our homes in free America. Later they may be used to modernize them!

FHA Financing Plan to Aid Fuel Conservation

A "SUMMER PLAN" for insured financing of insulation and other fuel saving installations, designed to assist in the national effort to conserve fuels, has been announced by the Federal Housing Administration.

Under the plan, the first payment on FHA-insured loans made during the spring and summer for this purpose may be deferred until the fall.

The FHA has notified the 5,000 private lending institutions authorized to operate under its Title I program that initial payments on loans made after April 1 may be deferred until November 1, 1944, provided the entire proceeds are used: (1) for the conversion of heating equipment to the use of other fuels, or the repair and replacement of heating equipment worn out or damaged; (2) for the application of insulation within existing structures; or (3) for installation of storm doors, storm windows, or weatherstripping.

The FHA's objective, in making this liberalization of its Title I loan terms, is to encourage home owners to undertake fuel conservation work during the warm weather season and thus prevent a heavy congestion of this type of work next fall.

Home owners having funds available should undertake fuel conservation work on a cash basis. The Title I plan, however, is available for assistanace of those unable to pay for such work in one lump sum.

Under Title I, loans for heating conservation measures are available through lending institutions in amounts up to $2,500 and are payable in monthly installments over as long as 36 months. The Board of Governors of the Federal Reserve System has exempted loans for these purposes from its restrictions on consumer credit. Generally, installations of the type involved may be undertaken without authorization from the War Production Board.

Expenses to Gas Meetings

THE British Minister of Fuel and Power has sanctioned payment by municipalities operating gas works of expenses of engineer employees to the annual meeting of the Institution of Gas Engineers.

Testing Gauges . . . *of Pressure Canners*
Is New Wartime Service of Gas Companies

By JESSIE MCQUEEN

Home Service Counsellor, American Gas Association

IN the food preservation program, so important in wartime, the pressure canner gains new importance. Its successful use is dependent on control of pressure. It is important at the beginning of each canning season that the pressure gauges be tested for accuracy. The pressure gauge is delicate and easily may get out of adjustment. If the gauge registers a pressure higher than it actually is, then the temperature may not be high enough to process properly the food inside the canner. If the gauge registers a pressure lower than it actually is, then the temperature is too high and the food may be overcooked, liquid lost from the jars, and jars broken.

In each state the Extension Service or the state college has maintained some form of testing service. In the past, with the fewer number of pressure canners in use and with less food preservation this testing has been sufficient.

In wartime, home food preservation gains new importance and the urban areas particularly now note a need for gauge testing. To meet this need, gas companies in a number of areas have set up a special service for customers.

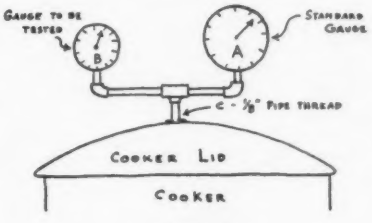
The plans followed in the few companies from whom we have secured information for this article have proven the ingenuity of the combined efforts of home service and engineering. They have set up plans with material available at a time when guage testers, which were manufactured formerly by pressure canner companies, have not been available in any appreciable number since the war demands have limited their production.

In order to check the gauge of a pressure canner, the gauge to be tested must be checked either against an accurate master gauge with the necessary pressure supplied by steam, water or air, or it may be checked by a temperature device such as a maximum thermometer.

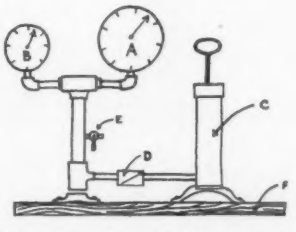
The pressure canner manufacturers indicated at the time of the National Canning Conference held in Chicago in January under the auspices of the War Food Administration that through the Spring, their service departments were set up to test and recalibrate pressure gauges sent in. A plan to continue the testing service by others through the summer months as tests may be needed is the basis of this article. Companies have followed either a plan of checking with the use of a pressure canner or with devices set up separately.

A. M. Palmer demonstrates his gauge-testing device to Miss Soule

SKETCH #1



SKETCH #2



Sketches 1 and 2, showing operation of Mr. Palmer's gauge-tester

The Brooklyn Union Gas Company, Brooklyn, New York—In the Brooklyn Union Gas Company, Alva Palmer of the Engineering Division has perfected a device which will enable the customer to have the gauge of her canner tested while she waits. When errors are found, the customer will be informed how she can compensate for inaccuracies in her gauge if it is not possible for her to return it to the manufacturer for recalibration.

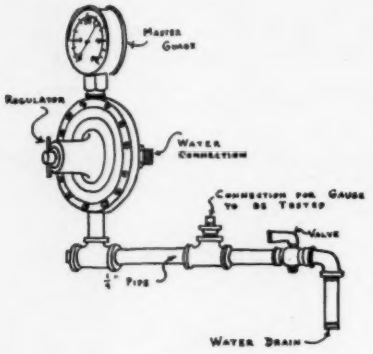
The simplest form of testing is a branch fitting screwed in a pressure cooker with the gauge-to-be-tested and the standard gauge brought to pressure from heat applied to water in the cooker. This method of testing ties up the gas company pressure cooker from use in demonstrations or in canning, and so our entirely separate device perfected with the cooperation of Ruth Soule, director of home service, is shown in Sketch 2. In this, the air pressure is obtained from a small and inexpensive pump, such as a bicycle pump or grease gun. As noted in the photograph, the method includes:

A—an accurate, standard gauge
B—gauge to be tested
C—small hand pump
D—check valve (tire valve)
E—small relief pet cock
F—wooden base

The small relief pet cock is a gas cock with standard spud peened down until the opening is hardly visible. The reason for this is to provide a slow movement for the exhausting of air and allows the pressure gauge to go down slowly. Mr. Palmer has indicated that gauges that are still available may be purchased in a plumber's supply house. A suitable substitute could be that of a gauge on a domestic steam house-heating boiler—a gauge which could be available during a summer season when the pressure canner would be in operation. In any case the gauge should be checked and from time to time rechecked by a standard gauge-tester or other available standard.

Pressure gauges in carriers are fre-

quently screwed in so tightly that women might have difficulty in removing the gauge, and in that way, the pressure cooker has been brought into the company. Mr. Palmer has suggested that a gas company undertaking this service should have on hand a thin, open-end wrench to loosen the gauge because it frequently rests so close to the cooker itself that an ordinary wrench cannot be used.



Sketch 3

Elizabethtown Consolidated Gas Company, Elizabeth, New Jersey—Mrs. Mary N. Hall, home service director, has submitted a plan for testing in which the assembly is connected to the city water main which, having a pressure for 50-80 lbs., gives the constant pressure factor.

"The pressure gauge is removed from the canner and inserted in the connection for it on the assembly of pipe and gauge. (Sketch 3) The governor is set for any desired pressure, the water turned on, and air is exhausted from the pipe with a steady flow of water. The valve at the end of the pipe is then closed, and the pressures shown on the master gauge and the one being tested should agree. If correct, the gauge will be replaced on the cover. If not correct, the customer will be advised to return it to the manufacturer where it will be repaired or replaced for a nominal fee. It is our purpose to have customers bring these gauges to our offices inasmuch as the test can be made in a few minutes."

Rock Island Gas & Electric Company, Rock Island, Illinois—The use of the air-conditioning system in the company building has provided the source of pressure for testing in this company. C. D. Trout, superintendent of gas service, reported that the dampers and radiators in the air-conditioning system of the office building in Rock Island were held under control with compressed air by a regulated pressure of 15 lbs. The equipment room of the air-conditioning system is located just back of the home service auditorium where Mrs. Margaret Crooks conducts her home service demonstrations, and the testing, therefore, is convenient as cookers are brought in. The control panel of the system has several gauges, one for each radiator and supply duct, so that it was well-known that the pressure being used for testing ran accurately at 15 lbs.

Central Illinois Light Company, Peoria, Illinois—Mrs. May McLoughlin, director of the home service department, states that their gauge-testing device is installed in the home service kitchen. Sketch 4 shows how this device can be installed and connected to the cold water supply.

She states, "We have ours located over the kitchen sink with most of the piping concealed behind the wall. The globe valve is opened when test is made and as the orifice is reduced to only 1/32nd of an inch opening, the shock of the water pressure is thereby reduced. The gauge to be tested is attached to the open Tee before the water is turned on. The test is made for 5 lbs., then 10 lbs., and then 15 lbs., waiting just long enough for the owner's gauge to record and to see how it compares with the master gauge.

"The pipe we used was ¼" and the air chamber ½", but whatever pipe is available may be used with fittings reduced to proper size for the gauges. It is a simple device and has been very satisfactory."

Binghamton Gas Works, Binghamton, New York—Inability to secure master gauges and the belief that a number of pressure canners, particularly war models, would not be equipped with gauges suitable for comparative testing, prompted the use of a maximum reading thermometer for testing during the 1943 Canning Caravan campaign.

E. Williams, new business manager, explains that the plan, while slower than the method employing use of a master gauge, proved to be accurate and thorough for all makes and models of canners. The entire pressure canner is required for the test, which insures adequate inspection of all parts and when the test is completed there is no doubt as to the ability of the canner to do an effective job.

The testing process requires a maximum reading thermometer calibrated to at least 300° F. A Taylor instrument Model 21464 was employed for the purpose. In addition a small wire rack or support was utilized to suspend the thermometer in the canner during the test.

The pressure canner is first carefully inspected to insure free functioning of the safety valve and escape cock. The safety valve is taken apart and the parts carefully cleaned to remove rust or corrosion. The canner is also inspected for any flaws or defects which would obviously prevent its use with safety. From this point on, the procedure for testing follows the same course that would be employed if actual canning were being done. For example, the canner is filled with one inch of water, the thermometer is then placed on a wire rack out of the water but in the space to be occupied by steam while the canner is in use. The cover is then firmly screwed or clamped in place and the canner placed over a lighted gas range burner.

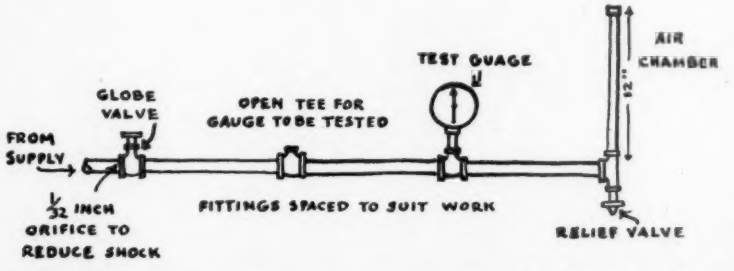
Steam is permitted to escape for 7 minutes and then the canner is heated to a pressure of 10 lbs. In case weights are used in place of a gauge, the weights are set in position for foods usually processed at 10 lbs. pressure. This pressure is maintained 5 minutes and then the pressure is permitted to return to zero, and then the pet cock is opened. At Binghamton at an elevation of 800 feet above sea level, the thermometer should register 240°, which is the temperature reached in a sealed canner under 10 lbs. pressure.

The same process is repeated, but the canner pressure is permitted to reach 15 lbs. A reading of the thermometer taken upon opening the canner should indicate a temperature of 250°, if the gauge is correct.

At the conclusion of the test, any inaccuracy of the gauge or the weight mechanism may be determined and, by reference to the temperature indicated at the two separate settings, reasonably accurate settings may be determined to permit the canner to reach correct processing temperature of 240° and 250° which are required for processing non-acid vegetables, meats, poultry, etc.

A notation is made on a card of the date of the test and the accuracy of the canner gauge. If the gauge proved in-

(Continued on page 219)



Sketch 4. Device for testing pressure canner gauges perfected by the Central Illinois Light Company

Natural Gas Conference Offers Strong Program

J. French Robinson

A STRONG program, limited to practical operating and management problems, has been prepared for the A. G. A. Natural Gas Spring Conference which takes place May 11-13 at French Lick Springs, French Lick, Ind. J. French Robinson, president, The East Ohio Gas Company, Cleveland, as chairman of the Natural Gas Department, and vice-president of the Association, will preside.

In addition to an all-day general session which will open the meeting, the program will include two symposiums covering important fields of natural gas operation. The first will review modern trends in the storage of natural gas both by liquefaction and by underground storage. Company experts from all sections of the United States and Canada will participate.

Transmission Symposium

The second symposium will deal with long distance transmission of natural gas from three separate angles: pipeline, compressing station and dehydration plants.

Among the featured speakers at the opening session will be Dr. R. R. Sayers, director, United States Bureau of Mines, and Dr. Charles E. Lawall, president, West Virginia University, Morgantown, W. Va. While Dr. Lawall is the only speaker outside the gas industry, before becoming an educator he had extensive experience in related industrial fields. At one time he was associated in an engineering or chemical capacity with such firms as: Bethlehem Steel Co., General Motors Co., New Jersey Zinc Co., and the Pittsburgh Testing Laboratory.

Of particular interest will be an illustrated talk, "A Gas Man at the Front in Africa and Italy," by Captain E. M. Borger of the American Field Service. Capt. Borger, who is president of The Peoples Natural Gas Co., Pittsburgh, recently returned from a year of frontline duty in Egypt, Tunisia and Italy.

Following is the program in detail:

First Session

Thursday Morning, May 11

10:00 A.M.

Presiding, J. French Robinson

Opening Remarks—Major Alexander Forward, Managing Director, American Gas Association

President's Greeting—Ernest R. Acker, President, American Gas Association; President, Central Hudson Gas & Electric Corporation, Poughkeepsie, New York

Remarks—R. E. Wertz, Past Chairman, Natural Gas Section; President, Amarillo Gas Company, Amarillo, Texas

Chairman's Address—J. French Robinson, Chairman, Natural Gas Department; Vice-President, American Gas Association; President, The East Ohio Gas Company, Cleveland, Ohio

Natural Gas Research: Its Importance and Possibilities—Dr. R. R. Sayers, Director, United States Bureau of Mines, Washington, D. C.

Education and the Industry—Dr. Charles E. Lawall, President, West Virginia University, Morgantown, West Virginia

Second Session

Thursday Afternoon, May 11

Purification of Natural Gas Having Large Sulphur Content—C. W. Cooper, Vice-President, Consolidated Natural Gas Company, New York, New York

Natural Gas Cycling and Its Significance to the Natural Gas Industry—Dr. Frank H. Dotterweich, Associate Professor, Natural Gas Engineering, Texas College of Arts and Industries, Kingsville, Texas (In collaboration with Robert Ducker, Assistant Director, Natural Gas and Natural Gasoline Division, Petroleum Administration for War.)

Data Obtained in Bureau of Mines Flow Tests on Gas-Condensate Wells (Illustrated with Slides)—Kenneth Eilerts, Physical Chemist, Petroleum and Natural Gas Division, United States Bureau of Mines, Bartlesville, Oklahoma

Third Session

Friday Morning, May 12

SYMPOSIUM ON NATURAL GAS STORAGE

Leader: J. French Robinson

Liquefaction of Natural Gas—Charles F. Turner, Chief Chemist, The East Ohio Gas Company, Cleveland, Ohio

Underground Storage of Natural Gas—

I. Appalachian Area

1. F. H. Finn, Chief Geologist, The Peoples Natural Gas Company, Pittsburgh, Pennsylvania (In collaboration with J. B. Corrin, Hope Natural Gas Company and J. J. Schmidt, The East Ohio Gas Company.)
2. Geo. S. Young, Vice-President, Columbia Engineering Corporation, New York, New York
3. J. H. Isherwood, Vice-President and General Manager, North Penn Gas Company, Port Allegany, Pennsylvania.
4. J. R. Reeves, General Superintendent, Natural Gas Republic Light, Heat & Power Company, Inc., Buffalo, New York
5. J. Hawker Newlon, Superintendent of Production and Geologist, The Equitable Gas Company, Pittsburgh, Pennsylvania (illustrated with slides)

Friday Afternoon, May 12

Underground Storage of Natural Gas (continued)

II. Other Areas

1. M. L. Fort, Supt., Compressor Plant and Pipe Line Operations, Pacific Lighting Corporation, Los Angeles, California
2. C. W. Studt, Production Engineer, Union Gas System, Inc., Independence, Kansas
3. W. R. Kubista, Engineer, Oklahoma Natural Gas Company, Tulsa, Oklahoma
4. Frank D. Howell, General Superintendent, Dominion Natural Gas Company, Ltd., Brantford, Ontario, Canada; President, Canadian Gas Association
5. P. D. Mellon, General Superintendent and Chief Engineer, Canadian Western Natural Gas, Light, Heat & Power Co., Ltd., Calgary, Alberta, Canada

Summary—E. G. Dahlgren, Technical Secretary, Research and Coordinating Committee, Interstate Oil Compact Commission, Oklahoma City, Oklahoma

Accounting Practices Employed in Underground Storage—F. B. Flahive, Comptroller, Columbia Gas & Electric Corporation, New York, New York

Fourth Session

Friday Evening, May 12

A Gas Man at the Front in Africa and Italy (Illustrated with Movies)—Captain E. M. Borger, American Field Service; President, The Peoples Natural Gas Company, Pittsburgh, Pennsylvania

Our Natural Gas Reserves, Lyon F. Terry, Second Vice-President, Chase National Bank, New York, N. Y.

Fifth Session

Saturday Morning, May 13

SYMPOSIUM ON LONG DISTANCE TRANSMISSION OF NATURAL GAS

Leader: Robert W. Hendee, President, Colorado Interstate Gas Company, Colorado Springs, Colorado

I. Pipeline

1. R. G. Strong, Supt. of Pipelines, Natural Gas Pipeline Company of America, Chicago, Illinois

(Continued on page 232)

Postwar Objectives . . . *What the Gas Industry Must Do To Develop Its Market*

Hall M. Henry (left) and Walter D. Crouch at the Rochester Conference where Mr. Henry delivered the accompanying postwar report

By HALL M. HENRY

Chairman, A. G. A. Postwar Planning Subcommittee

MARVELOUS claims are being voiced of the wondrous world of postwar. To some these claims spell the doom of many old established industries and some are even foolish enough to include the gas industry among the postwar casualties. To others these "fugitives from an over zealous imagination" have revived a none too settled doubt in their minds as to the future of the gas industry. These remaining doubts are being evidenced by guarded (because of their previous error in calling the gas industry a dying industry) questions as to where the gas industry is heading? Already the statement is being bandied about that we have just had "a shot in the arm from the war loads and just wait until the war is over and see how the gas industry fares."

Whether the future of our industry is a glorious one or one of mediocrity depends only on ourselves. To any one who has taken the pains to study our position it is clear we have a product which is capable of rendering a superior service under most, if not all, kinds of conditions and the overall operating costs have been satisfactory. It is only too true, however, that many of our sister utilities have not in the *past* fully capitalized on the value of gas and hence show little or no progress in the five or six years prior to the war. These companies have done much to weaken our position and are the source of most of the talk about our industry having no future. On the other hand, there is ample evidence of substantial progress in M.C.F. sales, revenues and, most important, net operating revenues by companies who have known how to promote the gas business.

Address before 1944 A. G. A. War Conference on Industrial and Commercial Gas, Rochester, N. Y., March 30-31, 1944.

What of the Future?

Thus there exists substantial evidence that our industry has been able to sell its product in competition with other fuels and make a profit. All of this, however, bears on the *past*—what you and I want to know is what of the future? What are the gas market opportunities postwar? What may we expect from the competitive fuel industries? Will postwar gas appliances meet the test of competition? Are our present methods of producing and distributing gas adequate? Can we supply the heating load on an economical basis? Should we change our B.t.u. standards? Will oil be available as a competitor and as a source of raw materials for our own industry? What are the implications of National Planning to our business? What are the economics of selling our product? How may we best sell gas service? How will commercial and industrial gas fare postwar? These are important questions and the answers are being sought by the A. G. A. Postwar Planning Committee under the able leadership of Alexander Beebee of Rochester, New York, operating through four major subcommittees:

(1) Postwar Purchasing Power and Potential Markets
(2) Competitive Factors Affecting Realization of the Market
(3) Gas Industry Factors Affecting Realization of the Market
(4) National Planning and Trends Affecting Realization of the Market

Let us review briefly the work of these committees and see how their findings may affect commercial and industrial gas sales developments.

(A) Postwar Purchasing Power and Potential Markets

C. V. Sorenson, Chairman

This subcommittee is attempting to determine the kind of world from an employment and earning or purchasing power viewpoint we may have to contend with. It is keeping abreast of those factors which will influence the production and distribution of goods. The first report has been printed and distributed. Thus if, as this study indicates, we are to have high employment and earning levels after the war—then naturally we must have a large productive capacity which will mean a larger commercial and industrial market potential for gas. It will also mean a greater opportunity for the sale of domestic and house heating gas since the people will have the spendable income with which to buy these services. Each company should, therefore, watch closely for the shifts to peace time products and see that gas service comes in for proper consideration. All of the factors studied clearly indicate a golden opportunity for postwar fuel sales but there are others with an eye on these markets and hence a committee has been formed to study the competitive situation.

(B) Competitive Factors Affecting the Realization of the Market

R. J. Rutherford, Chairman

Under the leadership of its chairman, ably assisted by R. E. Ginna of Rochester Gas and Electric Corp.; N. B. Bertollette, president, Hartford Gas Company, a study has been made of the competitive fuel situation. This report has been published and will make interesting and instructive reading. The highlights of this report which have a bearing on commercial and industrial sales may be listed as follows:

(1) "The electric industry will have at the close of the war a big surplus power generating equipment for which they will be seeking a market and it will be much concerned with the commercial

and industrial load because of their good load factor, in comparison with some of the domestic loads."

(2) In the matter of oil their studies show the following four indications:

(1) "An apparent scarcity of petroleum in this country both immediate and postwar.

(a) As a corollary to this, some government conservation and control programs are indicated.

(2) "The available supply will be higher priced both immediate and postwar.

(3) "Higher prices are not likely to curb the consumption of petroleum products for essential usage.

(4) "It is not likely that there will be any sudden dislocation in the usage of petroleum products."

Based on these *indications* the committee makes the following observations:

(1) "Competition from oil in all sales markets will be less.

(2) "Water gas manufacturing oil costs will be higher.

(3) "It would seem advisable that individual companies consider the probable impetus that might be given to the heating and industrial gas loads. This would include economic and rate studies."

As the committee has indicated and as anyone who has seen and studied the various releases on the oil situation must know, there exist data showing either a *threatened shortage* or an *ample supply* of oil and both sides have so-called "authorities" backing their contentions. Whatever may be the true facts the government has become alarmed over the situation—so much so it has passed a bill for $30,000,000 to build experimental plants for the production of oil and gasoline from coal, shale and natural gas and hence there is clearly indicated possible government conservation measures to insure enough oil for any possible future war. Hence the future of oil is at least clouded if not uncertain, which means that fuel users may be hesitant to adopt oil under such conditions. Certainly the findings of this committee would appear to offer hope for less competition from oil in the postwar period, or if competition remains it will not be with cheap oil prices. This should enhance our postwar opportunities for the sale of commercial and industrial gas.

Thus far the competitive fuel oil situation has seemed favorable to our side but unfortunately the threatened scarcity and high price of oil will affect our own cost of making gas and hence our ability to supply the markets economically. Hence we need to see how we fare from within our own industry and our ability to supply the market potentials that appear to lie over the horizon.

(C) Gas Industry Factors Affecting the Realization of the Market

Hall M. Henry, Chairman

The subcommittee studying this problem has the able assistance of a number of committees:

(1) Postwar Cooperating Committee of the Technical Section—Chairman, J. V. Postles, The Philadelphia Gas Works Co. This committee is handling the production and distribution economic studies and research studies.

(2) Economics of House Heating Committee—Chairman, H. O. Loebell, Consultant, Surface Combustion Division, New York, N. Y.

(3) Market and Economic Research Committee A. G. A.—Chairman, R. J. Vandagriff, St. Louis, Mo.—is studying Economics of Sales—Natural Gas. A similar study on manufactured gas has been completed and is about ready for distribution.

(4) New and Improved Postwar Appliances Committee—Chairman, F. M. Rosenkrans, New Business Manager, The Gas Service Co., Kansas City, Missouri.

(5) Mechanism for New Developments—A. V. Lundstrum, Ebasco Services Inc., New York.

Through these several committees we are attempting to determine our own strength and weakness and to correct our weak spots through research and development.

Let me highlight each of these so you will understand their importance to your own activities:

I. Studies of Economics of Production and Distribution as they now exist

Through the Technical Section's Postwar Cooperating Committee we are attempting to develop our present economics of production and distribution. The purpose being to see *first* whether we are using the most economical production and distribution methods and *second*, to see whether our best will enable us to compete in the postwar market.

These objectives are in the course of realization through studies of the following type:

(A) *What is the most economical B.t.u. gas to produce and distribute?*

Our present B.t.u. standards are in many instances a hangover from the last war and with but rare exceptions have been little changed. It would be a strange coincidence if they represent the most economical B.t.u. standard from a production and distribution viewpoint. It seems appropriate, therefore, to determine just what is the most economical B.t.u. gas from an overall viewpoint to produce and distribute, taking into consideration investment, fuels and their probable future availability, and known methods of manufacture. Such studies are under way.

Research is a pillar of the gas industry's postwar program. Here are Eleanor Speaker and Mark E. Ward, of the A. G. A. Laboratories' research staff, showing technical research equipment to Frank H. Trembly, Jr., of The Philadelphia Gas Works Company. The picture was taken during the recent research conference at Cleveland

(B) *What are the effects of* larger send-outs *on different unit costs of making and distributing gas?*

Here we will try to determine how the costs may increase or decrease as sales volume varies. One small manufactured gas company (8000 meters) has found that with an 80% increase in sales since 1938 its costs, outside of production, have *not* increased. These other costs amounted to 45¢ per M.C.F. in 1938 and now are 25¢ per M.C.F. This is an important factor in projecting the economics of larger sales, which are certain to follow in the postwar era.

(C) *What is the cost of producing oxygen? What are its economical effects on future gas-making?*

The use of oxygen has been suggested for gas-making many times yet has not seemed economical because of the cost of oxygen. It is now being used in two processes in Germany and may well be found advantageous to us. It makes possible a *continuous* gas-making process which would be desirable in any adaptation of the Fischer Tropsch process to our industry and the use of gas turbines. It should also increase the capacity per unit of plant. Studies are now under way on this subject.

(D) *What are the relative investment costs for low, medium and high pressure distribution systems?*

In view of the large loads awaiting our industry postwar in all fields—including commercial and industrial—we will undoubtedly have to enlarge our distribution systems. Hence we need to know in which direction we should head for the most economical distribution of gas. Some studies have already been published in the report by R. E. Ginna and indicate marked differences in costs between medium and low pressure systems. The cost per customer for added mains, meters, larger services being $30.00 for medium pressure vs. $100.00 for low pressure. Other studies are under way to check and enlarge the findings.

(E) *What can be done to increase capacities with minimum of investment—(a) Production—(b) Distribution*

Low investment costs are always desirable but are of special importance because of the relatively poor load factor of the heating loads which are expected in large volumes postwar. Preliminary studies show prewar water gas production equipment costs for large plants are of the order of $150.00 per M.C.F. of daily capacity and for small plants run around $300.00. Coal gas plant runs much higher and also produces coke which will compete in our heating market.

Thus a heating customer having a 2,000 cu.ft. per day peak load will require an investment in plant of from $300, to $600, to which must be added the distribution investment of from $30, to $100, depending on which type of system is used. These are large investment costs placing a heavy burden in fixed charges on heating loads and therefore demand we give every consideration to ways and means of reducing them. This would involve not only lower investment costs for the gas generating sets (which represent only 15% of the total plant production costs) but also the auxiliaries, purifiers, condensers, holders, pumps, blowers, exhausters and buildings, this latter being a substantial proportion of present day plant investment. We may have to sacrifice operating costs to obtain low investment costs and we can afford to do this if the *overall* costs are lowered.

Preliminary studies on the use of butane for peak loads appear most promising from an investment cost viewpoint and the *overall* costs do not appear excessive. The potentialities for the use of butane are sufficiently encouraging (at least for the companies and conditions studied) as to justify further extension into the heating field without waiting for those developments that will give us low cost equipment. However, our interest will be best served with a low investment cost generating equipment using coal or coke with oil or butane for enrichment.

Studies are under way on this but we need the help and ingenuity of the entire industry in solving this investment cost problem and in uncovering ideas that may require further research and study to develop their full potentialities.

"To Me, it means Certified Performance!"
cp
"To Me, it means tops in cooking perfection, a cooler, cleaner kitchen and big savings in time, food, fuel and money!"
GAS
. . . THE FLAME THAT WILL BRIGHTEN YOUR FUTURE

Spearhead of postwar gas range promotion will be Certified Performance equipment. This advertisement appears in the current Architectural Forum

II. Studies of Research Projects of Potential Value to our Industry

While we have not completed our studies of our present economics of production and distribution nor an analysis of where these leave us in the competitive fuel market we still are interested in lowering production and distribution costs and hence we are attempting to focus on research projects of promising value to our industry. Thus far it seems the following should be explored:

(1) Upgrading low B.T.U. gases without the use of oil.
(2) Upgrading of coal into high B.T.U. gases with the production of liquids as a by-product.
(3) Partial carbonization of coal prior to use in steam generation.
(4) Use of off-peak capacity for manufacturing of other products.
(5) Suggested new production methods that offer promise of a low investment cost or operating cost or both.

What are the possibilities from research

(a) Upgrading of coal or gas (without use of oil) into high B.t.u. gases with and without liquids as a by-product.

It seems to many in the industry* (although this viewpoint is not shared by all) that we must prepare our industry so that it is not dependent on oil for enriching purposes—and second we should have a process for making gas from coal which does not leave a by-product coke which competes in our markets. There are many good reasons pro and con on this objective. However, every one can agree that we need cheaper methods for making gas. Therefore, regardless of whether we must become independent of oil, we should pursue research which offers hope for lowering investment and operating costs.

One of the promising avenues of research lies with the Fischer Tropsch process. This process utilizes blue water gas to make liquids, either oils or gasoline. The process is interesting for several reasons: *First*—because of its great flexibility both as regards raw materials and products obtainable. Hence a variety of types of coke and coal as well as coke oven gas and natural gas may be used as raw materials for synthesis. But these are first converted to carbon monoxide and hydrogen. We can also have a wide choice of end results either large volumes of gases of high B.t.u. value with small quantity of liquids or a small volume high B.T.U. gases but a larger volume of oil or gasoline. *Second*—the efficiency of the process is just as high in small units as large units, thus not limiting its application to large plants. *Third*—The process will produce end products which are non-competitive in the markets we wish to reach. *Fourth*—because of the flexibility of the process the production of liquids can be reduced in periods of greatest gas demands and stepped up in periods of minimum demand.

The factors needing study are the relative investments required, for each stage of the conversion of blue water gas into liquids, oil and gasoline and the operating costs involved for each separate stage. In fact we need a careful study of the economics of this process when fitted or dovetailed into the needs of the gas industry. A casual study of the reported overall economics of producing gasoline from natural gas would immediately rule out the process, for with natural gas at 5¢ per 1000 cu.ft. gasoline would cost 8¢ per gal. including operating and fixed charges. What is not known and this is quite important is what the economics would be of producing high B.t.u. gases plus some liquids as a by-product—not a 100% conversion of the gas into liquids. All of the quoted figures on costs are for 100% conversion of gas

* The desirability of this is evident from the following observations made by Mr. Rutherford's subcommittee on competitive fuels: "It would seem desirable for the manufactured gas industry to begin research and planning so that in the succeeding years it might be less dependent upon petroleum products."

into gasoline. This may be more expensive than a partial production of liquids. The entire gas industry both manufactured and natural would be interested in a process which will produce mostly high B.t.u. gas for distribution with some small quantity of liquids, either oils or gasoline, as a by-product to help carry the conversion costs.

(b) Partial Carbonization of Coal Prior to Steam Generation:

There has been some work done on this idea—and the work abandoned. However, it is thought we should look to processes and methods which would result in all coal brought to a community for whatever purpose, being partially carbonized before use or completely gasified depending on the relative economics. In this connection the Winkler and Didier processes now in use in Germany, particularly if tied in with the gas turbine, offer interesting speculations as to their value to our industry.

Briefly in the Winkler process coals of the cheapest and of a wide variety can be used. The fuel is continuously blasted with one volume of oxygen plus two volumes of steam superheated to 375° C, thereby making gas continuously. What is of special interest is the fact that the gases leave the top at around 950 to 1000° C., only a little higher than the present day permissible temperatures for operating a gas turbine. There are seven of these plants in operation. One at Leuna, Germany, produces 2,648,000 cu.ft. of gas per hour. The capacity is 5,000 to 10,000 cu.ft. per sq.ft. of generator surface vs. 1500 cu.ft. for the old style water gas machine. The Didier process accomplishes the same end result using cheap fuel of a wide variety but applies heat externally to a series of tubes, thus also producing gas continuously.

Both of these processes may prove of interest and value to our industry postwar because they can use low grade fuels, because they have high capacity per sq.ft. of grate area, because the process is continuous, and finally because they may be tied in with a gas turbine for power generation.

(c) Suggested New Production Methods:

There are several new proposed methods for making gas using *known* principles—but have the elements of a *lower investment* cost for the gas generating equipment than now available. These will be fully explored to see whether they justify further work being done on them.

The above are recited to indicate some of the possibilities but they must be considered only as possibilities until we know more about their overall economic value to our own situation.

We have obtained this week from the A. G. A. Board a fund of $8,000 with which to study the different processes that may be of value to our industry and to try to select one or more which seems most promising with the thought of developing a research program to explore their real possibilities.

III. Economics of House Heating Loads

To many in the industry, the future of our industry is tied in with the heating load. However, there exist some misgivings as to our ability to supply this peak load business economically. There is also substantial agreement that our industry will have thrust upon it a sizable heating load whether we wish it or not. Hence the importance of determining at what rate or rates heating is profitable. A study covering this subject is under way and data will be available shortly. Once we have determined our economics and obtained rates to conform we can push heating in the commercial and domestic field with confidence that we will earn a profit for our companies.

IV. New and Improved Postwar Appliances

Our postwar domestic appliance needs are being studied by a committee headed by F. M. Rosenkrans. A comprehensive questionnaire covering replies from over 80% of the industry has been received and compiled. These replies will be reviewed by the committee along with the various regional gas association appliance surveys. The completed summary of recommendations for appliance improvements properly weighted for number of appliance units sold and segregated according to geographical locations and kinds of gas distributed, will then be sent to the Postwar Planning Committee for final checking, then circulated to the industry. These findings and recommendations, coupled with appliance research, should do much to insure proper and adequate postwar appliances.

In the commercial field you have your food service equipment subcommittee, headed by Frank Trembly of Philadelphia, which is studying equipment needs in this field.

An appliance study made by a committee of the New England Gas Association, headed by Roy Wright of Cambridge, Mass., made the following observation on commercial equipment:

"Of all the appliances analyzed, hotel and restaurant appliances showed the greatest need for changes, improvements, developments, research and new units.

"The committee feels that there is a definite need for research and development in

"Cooking With Gas" . . . . . by Jony Barlow
NOW YOU'RE COOKING WITH GAS, MYRTLE—BREAKFAST DONE ON TIME AND I MAKE THE 8:15
YES—AND THANK GOODNESS WE CAN USE GAS MORE NOW THE COLD WEATHER'S OVER
HEY POP, TELL THE ENGINEER HOW WE HELP SAVE HIM HAULING STORABLE FUELS BY USING GAS
TEACHER SAYS WHAT YOU SAID ABOUT SAVING ON ALL FUELS IN WARTIME IS JUST RIGHT, POP!
TICK TICK
If You Need a
GAS RANGE or WATER HEATER
If your needs for a gas range or water heater meet the requirements of present government regulations, it is possible to secure new equipment now. For complete information visit the nearest Gas Company office or your Appliance Dealer.
BOSTON CONSOLIDATED GAS COMPANY

Novel and effective cartoon-advertisement originated by Gerald Higgins, advertising manager of the Boston Consolidated Gas Company. This is the second in a series which will appear in Boston newspapers

this field. This cannot be done wholly by the manufacturers. In many instances the sales volume would not be great enough to enable the manufacturer to spend the money to develop needed improved appliances."

This study, if confirmed nationally, would indicate a need for a method of bridging the gap between the interests of the manufacturer and those of the gas industry in those cases where the sales volume does not justify research and development from his viewpoint—but is essential from ours. It would seem desirable for your section to determine the commercial appliances and industrial applications in this twilight zone, together with some data on the volume of gas involved and the information presented to the A. G. A. Board with recommendation for whatever action the findings would justify. Certainly we need to find some way to keep our commercial and industrial gas service up to date in all particulars if this is at all practicable.

Research at the Institute of Gas Technology on super-sonics offer interesting speculations as a means of meeting competition from electronics.

V. Economics of Sales

A study has been completed on the Economics of Sales for Manufactured Gas Companies and will shortly be released to the industry. A similar study will be made for natural gas by the Market and Economic Research Committee of A. G. A.

This study on manufactured gas companies clearly shows the *importance of Salesman Power* to results and the relation of total New Business Expense to M.C.F. sales, gross revenues and net operating revenues. A careful reading and application of the principles of this study to each company's situation will be invaluable. In it will be found data showing how doubling the number of salesmen doubled the results; that companies spending a larger sum for New Business got more for the dollars spent; that companies who spent above average on New Business got better than average results. It shows how to evaluate New Business results and how many salesmen are required to obtain a given result. We had hoped to obtain similar data for commercial and industrial gas sales but found many insuperable obstacles.

National Planning and Trends

Walter Beckjord, Chairman

The purpose of this committee is to keep abreast of National movements and political factors which may seriously affect our industry either favorably or adversely. This committee's report will of necessity have to await further developments before submitting its findings to the industry.

What Does It All Add Up To?

The foregoing gives a sketchy outline of the studies under way to help find some of the answers to the questions raised in the first part of this talk. You may well ask what does it all add up to?

To any one who has studied and analyzed these reports there are two inescapable conclusions. First, there is a definite and immediate need for *Research*—and second, we must prepare to fully *Capitalize* on our postwar opportunities.

What Are Our Research Needs?

Our research must be in two phases of our business—one, Utilization; the other, Production and Distribution.

Utilization or appliance research (which is going on now to the tune of over $125,000 per year by our own industry) must continue to develop principles which will enable the manufacturers of appliances to reflect the great possibilities inherent in gas and thereby surpass in performance anything that our competitors have to offer. This appliance research must develop "matchless" lighting, that is, automatic lighting *without ever having to use a match* and this "matchless" lighting must be made standard equipment on *all* gas appliances and not on just higher-priced merchandise. It should be so simple in application and so reasonable in price that it can be applied to the 2,000,000 or more house heating jobs that now have to be lighted in the fall and shut off in the spring at an expense of from $2,000,000 to $4,000,000 per year, to say nothing of the embarrassment to our industry in not having equipment that can be started or stopped by the mere pushing of a button or switch that even our more crude competitors can boast.

The number one *appliance research* objective should be the attainment of "fully automatic (matchless) safe lighting at a reasonable first cost." Naturally along with this our appliance research must seek new and better ways in which to apply gas to produce the ultimate in gas service. The domestic appliance research, with double the funds of previous years, has an excellent program looking to these objectives and given proper encouragement and continued financial support our postwar appliance needs should be fully met.

In our appliance research we must not overlook those research projects in the commercial and industrial fields that are necessary and which we cannot expect the manufacturer to carry out for the simple reason he does not have a large enough market for the improved appliance to justify the research expense. In these cases we must have a frank and free understanding with the manufacturers as to what we can expect from them and just what we must do for ourselves. Your committee should uncover these needs and report to the Board on those requiring research but which may have to be financed by the gas industry.

Gas Production Research

In the field of gas production the need for research is, if anything, of greater importance than all other activities of our industry. This is clearly indicated when we realize that the present methods for making gas are intermittent and entail large investments in equipment and the use of fairly expensive fuels, whereas our need is for a continuous process utilizing gas production equipment of low first cost and low operating costs. Low investment cost equipment as previously mentioned is especially necessary if we are to supply profitably the large potential heating markets which lie ahead and which many believe must be supplied if we are to hold our place in the sun which is our number one objective but we need to advance along these lines as rapidly as possible. Similarly a low operating cost is essential.

To achieve these objectives of making gas continuously with low investment cost and low operating cost may well mean using methods radically different from those now in use and employing high pressures—superheated steam and perhaps oxygen and utilizing a gas turbine to reduce the exit gas temperatures and producing power for the plant or making oxygen. It may also mean employing our gas-producing equipment during off-peak periods for the production of useful and saleable products.

For the long pull some of our leaders think our opportunity lies in the development of a process which up-grades coal into gases with liquids (oil or gasoline) as a by-product. The process should be flexible enough to permit making maximum quantities of high B.t.u. gases in the winter months when the need is greatest with the minimum production of liquid fuels as a by-product. The reverse to be possible in the other months.

There is also some thinking that we should take all of the coal that comes into a community for whatever purpose and take off the high volatiles and tars and use the remainder for steam generation either as a coke fuel or in the form of gas and also using a gas turbine on the exit gases for power generation. There are some indications that these thoughts can become more than dreams.

What is needed is a thorough study of the possibilities and a sound research program along whatever lines such a study may indicate. Certainly we cannot sit idly by when our very existence may be at stake.

Full-time Director of Research

To insure the attainment of the above appliance and production research objectives the services of a full-time Director of Research is absolutely essential. This thinking is concurred in by some 40% of the manufactured gas industry with whom this question has been checked recently and is the unanimous recommendation of the Postwar Cooperating Committee of the Technical Section and A. G. A. Postwar Planning Committee. The industry is now spending one-third or more of its American Gas Association funds on research projects without the benefit of a director to lend direction and continuity to the research endeavors.

A full-time director could, in the judg-

ment of some, obtain many additional thousands of dollars from allied sources for gas research. These added dollars are readily available and only await some one to point the need along with the opportunities. Such a director would earn his annual salary and expenses many times over by eliminating much of the duplication and spasmodic research projects that a casual survey of the past will show has been taking place. A director of research would not determine the nature of our research—this would be left with the appropriate sectional committees with the approval of the top research coordinating committee to be appointed under a recent American Gas Association Board action. With research being such an important factor in our ability to meet the fuel competition of the future and with a shortage of gas-making materials facing us, it would seem a director of research would be one of our best insurance policies and should be obtained with little loss of time.

Do All We Can Now To Lower Costs and Investments

We need to give more thought to ways and means of exchanging useful ideas and data which each of us have that have resulted in a lower operating cost or a lower investment in equipment. We must, until our research opens up new vistas, take full advantage of the present knowledge of our art that is spread among our companies. To do this will require a new method of approach to our joint conferences and meetings—it may even mean a thorough overhauling of our accounting practices to make such enlightenment possible. However, a comparison of most any two companies will disclose strengths and weaknesses in each that are not in the other—let's eliminate the weaknesses.

Until we can solve this important problem we will be seriously handicapped in expanding plant facilities for new loads. This is evident even though oil can be obtained (which is by no means a certainty) for ten to fifteen years; the most optimistic estimates are fourteen years. With the uncertainties ahead, if a company has to expand its plant facilities using water gas equipment, it is faced with the possibility of having to write off this new investment in ten years or less, thus placing a heavy burden of fixed charges on these expanded facilities. Therefore anything that we can do to uncover ways and means now in use by companies for obtaining increase in capacities of equipment at low first cost is of prime importance to our industry and should be diligently pursued.

An Adequate and Properly Trained Sales Force Is Essential

One of our most glaring weaknesses of the past has been a woefully inadequate and poorly trained sales force. With but a few notable exceptions has a company employed sufficient sales personnel (Company plus Dealer) to fully develop the

(Continued on page 231)

Postwar Home Building Forum

Panel group at postwar forum. Left to right: R. E. Finnin, Boston Consolidated Gas Company; George R. Glendining, president and editor, Banker & Tradesman; A. Sworn Goldman, associate editor, Architectural Forum; J. S. Crane, vice-president, American Builder Magazine; J. J. Quinn, Boston Consolidated Gas Company

BOSTON architects, builders and bankers gathered March 16 for a Postwar Home Building Forum sponsored by the Boston Consolidated Gas Company in its main auditorium.

Speakers were J. S. Crane, vice-president of American Builder Magazine; A. Sworn Goldman, associate editor of Architectural Forum; and George R. Glendining, president and editor of Banker & Tradesman.

Mr. Goldman discussed the "package house" idea, by which homes would be sold with all mechanical equipment included in a long-term mortgage, while Mr. Crane predicted that houses will cost more to build after the war. Mr. Glendining foresaw a postwar price range for new houses of between $5,000 and $7,500. He saw prefabrication as only a small factor in the New England area in at least the first years after the war.

A highlight of the meeting was a postwar poll taken among those present. The following opinions were expressed by 42 builders, 31 realtors, 18 architects and 17 bankers.

93% believed the average house after the war will be built to sell for between $4,000 and $8,000.

82% believed very few basementless houses will be built in the New England area.

63% favored the forced-warm-air type of heating system for new homes.

92% believed the pre-fabricated house will be of only minor importance as a postwar feature in New England.

On a final poll question, "Do you think that all-year air-conditioning will be an important feature in houses selling for over $8,000?" affirmative answers were received from 80%.

The meeting was arranged by R. E. Finnin, manager of the gas company's apartment-builder division. J. J. Quinn, sales manager of the company, presided and the meeting was opened with a brief address of welcome from E. H. Eacker, vice-president. A comprehensive question-and-answer period followed the speakers' portion of the meeting.

Architects, builders and bankers in attendance at the forum

General Committee of the Southwestern Gas Measurement Short Course. Left to right, front row: James L. Griffin, Omaha; Miss Kate A. Niblack, Oklahoma City; W. H. Woods, Houston; Max K. Watson, Amarillo; Earl Kightlinger, Shreveport; W. H. Carson, Norman; R. M. Scofield, Dallas. Back row: E. C. McAninch, Tulsa; E. L. Stark, Dallas; George E. Greiner, Bartlesville; C. E. Terrell, Birmingham; Lloyd L. Jordan. Eldorado; W. R. McLaughlin, Dallas; C. A. Gibson, Bartlesville; L. B. Taylor, Wichita

Gas Measurement Course in June

THE General Committee of the Southwestern Gas Measurement Short Course met in Oklahoma City recently to elect new members and to transact other business. Max K. Watson, general chairman, presided.

George E. Greiner, Phillips Petroleum Company, Bartlesville, Oklahoma, was elected as a member from industry to replace G. W. McCullough, ex-officio member. B. F. Worley, United Gas Corporation, Houston, Texas also from industry, was elected to replace R. J. Sullivan who resigned. Lloyd L. Jordan was elected to represent the Arkansas Oil and Gas Commission, and L. B. Taylor was elected to represent the Kansas Corporation Commission.

After the election, considerable time was spent in discussing the program of the forthcoming short course which will be held at the University of Oklahoma, Norman, Oklahoma, June 6, 7, 8, 1944. A tentative list of lecturers and instructors was drawn up and Earl Kightlinger, chairman of the Program Committee was instructed to invite each person selected, to participate in this year's course.

E. C. McAninch reported on the activities of the Practical Methods Committee and was instructed to continue with his studies and if possible have a report ready for distribution in June. It was the unanimous opinion of the General Committee that the proceedings of this year's course should be published in bulletin form. R. M. Scofield is chairman of the Publications Committee. The chairman of the Exhibits Committee, W. H. Woods, stated that most of the manufacturers who have participated in the past are making up educational exhibits for this year's short course.

Gas in War

A STOCKHOLM report quoted by the Algiers radio says that the largest gas works in Copenhagen have been destroyed by fire.

The Rome correspondent of a Swiss paper stated that the air raid on Rome on March 3 severely affected the gas and water supplies and that water was obtained by people in long queues from the famous fountains.

Gas sales in Great Britain have increased since 1938 by 16%. Allowing for the decrease in street lighting due to dimouts and blackouts, the increased consumption is 21%.

New gas lamps are being installed in a number of badly blitzed streets in London. The lamps are usually bracketed to the walls but the latest installations are mounted on wooden posts.

New Gas Water Heater Standards Available

APPROVAL requirements for gas water heaters adopted as American Standard by the American Standards Association on February 23, 1944 are now available in printed form. This is the ninth edition of these requirements and replaces a mimeographed issue previously distributed to interested manufacturers. They are effective as of January 1, 1944.

Principal changes in the construction features incorporated in this edition involve required compliance of various commonly used accessories with latest American Standard listing requirements for such devices. Gas valves, thermostats and temperature and pressure relief devices constitute outstanding examples.

Bringing the water heater standards in line with performance tests for other types of gas appliances, normal test pressure for use with manufactured gas has been increased to 6 inches. In addition, provisions for testing and certification of water heaters for use with mixed gases now being distributed in various territories have also been incorporated.

Other important changes in performance tests are new provisions for testing insulated gas water heaters so that they may be installed flush to walls in modern homes.

Copies of these American Standards may be obtained from the American Gas Association Testing Laboratories, 1032 East 62nd Street, Cleveland 14, Ohio. For additional information, inquiries should be addressed to R. M. Conner, director, at the above address.

Washington Gas Wins Security Award

AN engraved scroll constituting an award for "superior standard" of civilian protection was presented April 11 to the Washington Gas Light Company. Only fifty-six such awards have been made throughout the United States.

The ceremony of presentation by Commissioner John Russell Young was witnessed by the Commanding General of the Military District of Washington, the members of the District of Columbia Public Utilities Commission and the Director of Region II of the Office of Civilian Defense.

The award was received for the Washington Gas Light Company by Vice-President and General Manager Everett J. Boothby who later passed it along to units in the Washington Suburban Gas Company, the Rosslyn Gas Company and the Arlington and Alexandria Divisions of the Company.

In expressing appreciation of the award, Mr. Boothby stressed that it carries the same significance as the Army and Navy "E" for industrial plants. He pledged that the same security efficiency especially in efforts to prevent time-consuming accidents would constantly be maintained by the company.

Exhibit To Portray Safety Progress

RECOGNIZING the splendid work done by the gas industry not only in connection with the war effort but throughout its long history of achievement, the National Safety Council through its public utility sectional chairman has requested pertinent safety posters, ideas or wrinkles to be submitted for exhibition at the National Safety Congress in Chicago, October 3-5. Such an exhibit will serve to portray some of the progress which has been made in safety in the gas industry.

E. S. Miner of the American Telephone and Telegraph Company is chairman of the Public Utilities Section of the National Safety Council and J. P. McCann of the New England Power Service Company is chairman of the Exhibit Committee.

Michigan Gas Production in 1943 Hits New High

BREAKING all previous records, Michigan's natural gas production in 1943 exceeded that of 1942 by almost 2 billion cubic feet. The state's wells yielded 10,581,420,000 cu.ft. of dry natural and casinghead gas, having a heat value equivalent to that of approximately 1 million tons of coal or 4 million barrels of oil.

The gas was valued at $2,841,607 at the well, an average of 14.56 cents per 1000 cu.ft. Natural gas production in Michigan has been increasing since 1938, when it was less than 10 billion cubic feet.

Personal AND OTHERWISE

S. B. Severson Honored by Associates

S. B. SEVERSON'S twentieth anniversary of service as vice-president and general manager of the Dominion Natural Gas Company Ltd., and Republic Light, Heat and Power Co., Inc., was celebrated with a dinner party attended by thirty-four of his executive and supervisory associates at the Buffalo Athletic Club, Buffalo, New York, on Friday evening, March 24.

At this fete Mr. Severson was congratulated and complimented for his success during the past twenty years in meeting the many problems with which he has been faced, including stiff electric competition and the rendering of gas service under many adverse conditions.

Frank D. Howell, president of the Canadian Gas Association and a division superintendent of the Dominion Natural Gas Company, Limited, extended the gratitude of approximately five hundred employees to Mr. Severson for his fine and friendly leadership. One hundred and thirty-five of those employees were with the Dominion-Republic Group of properties when Mr. Severson arrived in Buffalo to assume the management on March 24, 1924. He had previously been associated with several other Cities Service Companies during the previous seventeen years.

During the past twenty years the companies under Mr. Severson's management acquired through purchase gas distribution systems in Niagara Falls, N. Y., Kenmore, N. Y., Port Colborne, Ontario, St. Thomas, Ontario, and extended gas service to Preston, Hespeler and several other smaller communities in Ontario, Canada. Among the many problems met in the last two decades were the purification of high content sulphur natural gas, underground storage of natural gas, and the erection of a propane plant for winter peak load service.

Promotionally, the Dominion Natural Gas and Republic Light, Heat and Power Companies have been acclaimed for their leadership in "Employee Selling," development of house heating sales programs, and for the National Best Performance Award in 1941 for CP gas range selling. These companies also have been most active in supporting other national cooperative undertakings of the American Gas Association.

A testimonial booklet was also presented to Mr. Severson including the signatures of all the men who attended the celebration and also those who have served the Dominion Natural Gas and Republic Light, Heat and Power Companies for twenty years or more under his supervision.

Mr. Severson is also vice-president and director of five additional gas companies operating in the vicinity of Hamilton, Ontario, Canada, including the United Gas and Fuel Company of Hamilton, Limited, the Hamilton By-Product Coke Ovens Limited and the Wentworth Gas Company, Limited.

Appointed Director of Home Economists

Marguerite Fenner

THE Pacific Gas and Electric Company has announced the appointment of Marguerite Fenner as the director of home economics for its entire system. Miss Fenner has been serving the company for some six years as appliance counselor and home economist in the Sacramento division.

Miss Fenner holds a degree of B.S. in Home Economics from the University of South Dakota. She is currently serving the Pacific Coast Gas Association as chairman of its Home Service Committee. She recently organized and directed the program of the Association's annual Home Service Conference which took place in San Francisco on March 1 and 2.

Dr. Vandaveer Named

EFFECTIVE April 10, 1944, Dr. F. E. Vandaveer was reappointed supervisor of the Cleveland Branch of the American Gas Association Testing Laboratories.

John Keillor Retires

JOHN KEILLOR, gas engineer, British Columbia Electric Railway Co., Vancouver, retired March 15. Mr. Keillor is a past president of the Canadian Gas Association and has served as a director of the Pacific Coast Gas Association, of which he has been a member for 24 years. Born in Scotland, Mr. Keillor has been a gas man for fifty years.

He will be succeeded by E. H. Rohrer, of Montreal.

Dinner party marking S. B. Severson's 20 years of successful utility management

Krug Leaves OWU for Naval Duty

J. A. KRUG, has resigned as director of the Office of War Utilities, War Production Board, to enter active duty as a Lieutenant Commander in the Navy. He was sworn in April 10 and reported at Norfolk April 24 to begin training as a damage control officer.

WPB Chairman Donald Nelson has announced the appointment of Edward Falck as OWU director. Mr. Falck was previously deputy director and has been associated with the organization since Office of Production Management days.

Mr. Krug has been a speaker at a number of American Gas Association meetings and his administration of wartime utility regulations has been widely commended. In a final statement as OWU director, Mr. Krug expressed thanks for the cooperation shown him by the utility industry.

Dr. Dobbins Commended for Safety Work

DR. THOMAS DOBBINS, medical director of Servel Inc., has been commended by Frances Perkins, Secretary of Labor, for his work as state chairman of the National Committee for the Conservation of Manpower in Defense Industries during the past two years.

The purpose of the committee created by Secretary Perkins on which Dr. Dobbins is serving, is to enlist the voluntary services of trained safety men all over the country, and to awaken labor and industry to the special need for industrial safety in the war effort.

Explaining some of the work done by the committee Dr. Dobbins said, "The work of the group is carried on by volunteer agents throughout the country who give a portion of their own time to visit plants and help them solve their safety problems."

Irene Hickey, Detroit, and Jessie McQueen, A.G.A. Home Service Counsellors New York

Canning Clinic

ATTENDANCE at the National Victory Garden Institute in Detroit this spring provided the germ of an idea for Irene Hickey, home service director of the Michigan Consolidated Gas Company. As a result, she set up a Canning Clinic and refresher course for professional people who plan to give canning instruction this summer or who are responsible for canning programs in community centers.

The program provides for discussion of all phases of canning procedures including an analysis of 1943 experiences toward the goal of agreement in uniform plans and directions to be used throughout the Detroit area.

The four-day Canning Clinic opened Monday, April 17, at the gas company building, with meetings both afternoon and evening and invitations extended to all home economists, teachers, dietitians, nutritionists, and newspaper women. Specialists from the city and state Boards of Health and Extension Departments were consulted and in many instances their groups were represented in the discussion.

On a visit to Detroit, Jessie McQueen, of the American Gas Association, made available material from the National Canning Conference held in Chicago in January by the War Food Administration and, more recent, from the State Conference at Cornell University. She gave information on the 1944 food preservation plans being made by home service departments of gas companies as indicated in the Home Service Committee questionnaire.

Miss Moomaw Advances

MISS HONORIA B. MOOMAW, acting secretary of the Natural Gas Department of the American Gas Association, has been advanced to secretary. Miss Moomaw was appointed acting secretary of the Natural Gas Section on June 15, 1942. When the Association reorganization became effective earlier this year and the Section became a Department, she continued as acting secretary.

Folks I Have Known*

By JAMES M. WOODMAN

WILLIAM JAMES WELCH

IT is unnecessary to introduce William James—familiarly known as "Bill"—Welch, general foreman of the distribution department of the North Shore Gas Company, with whom he has been associated for more than 46 years. He has risen from a place at the bottom of the roll of employees to one of great responsibility. He had no relatives among the large stockholders, no special favors were granted to him, no "pull" or influence of any kind was instrumental in his promotions. There was only a willingness to work to disregard the clock's marking of the hours, a desire to assist his superiors in satisfying an ever impatient public, to be always on the alert to follow orders when once given, or better still, to do that which should be done without being told.

There is something inspiring about the story of this man who started with a small gas manufacturing and distributing company, with less than ten miles of main and service pipe lines, gaining in experience and usefulness, taking an active part in the installation of more than 500 miles of pipe lines serving thousands of customers in an extensive area, north, south and west of Waukegan.

He will smilingly and joyfully tell you of his early days with the company. How he started at a salary of $65 per month and worked from 7 o'clock in the morning until nightfall—frequently on Sundays and holidays. His reminiscences include the hauling of coke—a bi-product—and begging people to buy it at $4 per ton; of digging trenches for service pipes into homes and places of business; of piping residences in the winter time; of getting up in the middle of the night to investigate a complaint from some subscriber that a leaky pipe was filling the house with gas. But, he never grumbled about carrying the load assigned to him, and today he is referred to as the company's oldest employee in years of service, entrusted with the supervision of a most significant department.

Mr. Welch

"Bill" Welch may never attain a greater title than the one he now bears; he may never become a millionaire or see his name in large type on the front page of a newspaper. He will probably be content with having been a distinguished member of that mighty band of American citizens, referred to by the martyred Lincoln, when he said: "God must have loved the common people, he made so many of them."

* This tribute to North Shore Gas Company's oldest employee is reprinted from the Waukegan News Sun.

Claudia Brant Is Home Service Director

CLAUDIA BRANT, who has been a member of the Home Service Department of the Kansas City Gas Co. for the past five years, has been named home service director of The Wyandotte County Gas Co. in Kansas City, Kansas, it has been announced by Clarence H. Waring, general manager of the company, and Jess G. Tooker, new business manager. She assumed her new duties on April 1.

Miss Brant takes over the duties of Betty Boyle, who recently resigned from the company to join the Air WAC.

A. G. A. Engineer Joins Stove Company

FRANK H. FISCHER, test engineer with the American Gas Association's Cleveland Testing Laboratories, has resigned to accept a position as a development engineer with the Dearborn Stove Company of Chicago, manufacturers of space heaters.

Entering the Laboratories' employ in 1939 following his graduation from Ohio State University as an electrical engineer, Mr. Fischer acquired a thorough training during the next four years in all phases of appliance testing and inspection. This, together with a wide acquaintanceship among gas appliance manufacturers gained from visits to their factories, has given him an excellent background for his new responsibilities.

Louis F. Page, who joined the Laboratories War Products Department following his graduation from Tri-State College in 1942 as a mechanical engineer, entered the Army during March. The latest member of their staff to enter the armed forces, Mr. Page represents the 50th Laboratories' employee now in our country's service.

Personnel Changes

THE Washington Gas and Electric Company, Tacoma, which serves manufactured and butane air-gas in twelve western Washington cities and towns, recently announced several personnel changes.

F. R. Merris has been appointed general manager of the company after serving as secretary and treasurer since 1930.

M. C. Hancock, formerly manager of the company's Aberdeen division, became distribution superintendent of the Tacoma division succeeding J. H. Harris, who died in January. Mr. Harris had been associated with the company for 33 years. E. J. Renz succeeds Mr. Hancock at Aberdeen.

Leonard Hale, of the Tacoma commercial department, has been appointed manager at Olympia succeeding George Earsley, who has entered the armed services.

Buy War Bonds and write your own ticket for the future.

Natural Gas Research Leaders Retire from Committee Posts

H. C. Cooper

LONG standing teamwork of two pioneers in the conduct of organized research in the natural gas industry was ended last month with the announcement of the retirement of Howell C. Cooper and Thomas R. Weymouth as chairman and vice-chairman respectively of the Main Technical and Research Committee of the Natural Gas Department of the American Gas Association. Thus closed one distinguished chapter in the history of natural gas research which spanned more than 22 years of active coordinated effort.

Both men having retired from active business affiliation although continuing in important consulting work—some of it involving the war effort—felt that the reorganization of the Natural Gas Department of the Association afforded an opportune time for them to bow out of their active leadership of this vital research activity and turn the reins over to younger men in the industry. Their personal contributions and the achievements of the Main Technical and Research Committee have been widely recognized throughout the gas industry. Both Mr. Cooper and Mr. Weymouth have received the industry's highest honor, the Charles A. Munroe Award, for their research leadership and their many other contributions toward the advancement of the industry.

When Mr. Cooper received the Munroe Award in 1938, the award committee paid tribute to his leadership of the Main Technical and Research Committee in these words:

"While many eminent natural gas engineers have been associated with Mr. Cooper on the committee and have contributed greatly to its accomplishments, he has continued through the years to chart its course and make possible its remarkable achievements. In our opinion, Mr. Cooper has been largely responsible for the unique and respected position which this committee has earned in the scientific circles of the gas and related industries."

Mr. Weymouth received the Munroe Award in 1941 at which time he was cited not only for his leadership as chairman of the Gas Measurement Subcommittee and other organized research activities but also for his long and distinguished record of individual accomplishments of a fundamental and permanent nature. The list of his inventions and original contributions is long and imposing.

T. R. Weymouth

In 1940, speaking at the Natural Gas Convention, Mr. Cooper reviewed the activities of the Main Technical and Research Committee and pointed out how early subcommittees, instead of disbanding after completing their appointed tasks, became transformed into permanent institutions of the Association and continued to make technical and scientific reports through the years. In this manner all problems which arose relative to the production and conservation of gas were delegated to the Gas Well Subcommittee under the chairmanship of N. C. McGowen. In similar fashion, the Gas Measurement Subcommittee, directed by Mr. Weymouth for the past 22 years, took charge of the measurement and technical matters in several other fields. A third group, under the leadership of H. D. Hancock, presided for years over all problems relating to pipe lines, leakage from pipe lines, hydrates and allied matters.

The natural gas industry and the American Gas Association are indebted to these distinguished pioneers who have contributed so much to their advancement.

Miss Stewart Feted

Miss Nellie F. Stewart, for many years head of the American Gas Association stenographic department, receiving flowers and gifts on the occasion of her retirement from active duty April 1. Miss Stewart had completed more than 25 years of Association work, having joined the staff on Jan. 14, 1919

AFFILIATED ASSOCIATION *Activities*

Southern Gas Association Annual Meeting Makes Notable Contributions

MORE than 600 attended the Wartime Conference of the Southern Gas Association held March 22 and 23, at the Roosevelt Hotel, New Orleans, Louisiana.

The meeting, one of the most successful in the Association's history, was keynoted in the President's Address, "Gas—Its War Task and Postwar Responsibility," by Frank C. Smith, president, Houston Natural Gas Corporation, Houston, Texas. Mr. Smith painted a glowing picture of how the gas industry, both natural and manufactured, has carried out its war task and wherein lies its postwar responsibility. In regard to the latter, he charged each gas company with the responsibility of bearing "its own part of the cost and effort necessary to assure the preservation of our industry's integrity as a growing, developing factor in American progress." He specifically called for complete support of two major pillars of the industry's structure, namely, its program of research and national advertising.

Kelly Elected President

Frank S. Kelly, Jr., Arkansas Louisiana Gas Co., Shreveport, was elected president of the Association for the 1944-1945 term. Other officers elected at the meeting are: first vice-president—Clayton L. Nairne, New Orleans Public Service, Inc.; second vice-president—John H. Warden, Oklahoma Natural Gas Co., Tulsa; secretary-treasurer—L. L. Baxter, Arkansas Western Gas Co., Fayetteville, Ark.

Speakers and their subjects in the general sessions of the conference were:

A. B. Paterson, president, New Orleans Public Service, Inc., outlined steps to be taken to maintain postwar employment in his address on "Full Employment in the Postwar Era."

H. Carl Wolf, president, Atlanta Gas Light Company, discussed the need for more general advertising nationally on gas and gas services from an industry standpoint. The conference passed a resolution placing the Southern Gas Association on record as advocating increased advertising by the gas industry.

J. C. Flanagan, United Gas Pipe Line Company, Shreveport, Louisiana, in a paper "Employee Conditioning," outlined methods of better fitting present employees for their jobs and ways of selecting new employees. His paper was presented by H. L. Hightower, of Shreveport.

"The Fifth Big Job: Gas Air Conditioning" was the subject of G. E. May, New Orleans Public Service Inc., who suggested means of preparing now for capturing the gas air conditioning load as soon as equipment becomes available.

Dean Strickland, sales manager, United Gas Corporation, Houston, gave the results of a survey conducted in the Southern territory on conditions of present gas appliances and needs for future gas appliances.

Col. W. F. Rockwell, president, Equitable Meter Company, Pittsburgh, warned against trends of government in industry in his paper, entitled "The Manufacturer Looks to the Future." In Col. Rockwell's absence, his paper was presented by Arthur J. Kerr, district manager, Pittsburgh Equitable Meter Company, Tulsa.

In his address on "Servicing," J. H. Collins, New Orleans Public Service Inc., gave some interesting data on servicing in war time and suggested some new approaches to the servicing problem.

Arthur P. Hirose, director of market research and promotion, *McCall's Magazine*, gave some enlightening information on the relative position in the public mind of gas and competitive services, as shown by surveys conducted by his organization. His subject was "Blueprints for Better Living."

Louis P. Ruthenburg, president, Servel, Inc., drew in broad masterful strokes a picture of the gas industry's future in his address entitled "Going Forward With Gas." He advocated a postwar arrangement for the gas industry in which the ablest utilities men and manufacturers would constitute a "supreme board of strategy," together with a proposed "board of appliance sales strategy," both of which would insist on research and long-term planning.

Col. Ora J. Cohee, Chaplain, Eighth Service Command, Army Service Forces, Dallas, Texas, was the general luncheon speaker. His inspirational message was entitled "The Meaning of Democracy."

One of the outstanding features of the conference this year was the excellent standard of programs presented in the sectional meetings, all of which were unusually well attended and acclaimed as most successful and timely.

Courtesy The Times—Picayune

Newly elected Southern Gas Association officers pictured at the New Orleans annual meeting. Left to right, front row: Frank S. Kelly, Jr., president; Frank C. Smith, outgoing president. Rear row: L. L. Baxter, secretary; John H. Warden, second vice-president; Clayton L. Nairne, first vice-president

Sales Conference Section

The Sales Conference Section, presided over by J. H. Warden, Oklahoma Natural Gas Company, Tulsa, Oklahoma, opened with an address on "Appliance Financing Trends" by L. M. Lilly, president, First Bancredit Corporation, St. Paul, Minnesota.

Seward Abbott, regional sales manager, Servel, Inc., Dallas, made a plea for proper selection and training for postwar sales organizations. His subject was "As We Approach the Day of Recruiting and Training the Sales Organization."

A panel discussion, "Conditions and Problems of Postwar Markets," was conducted by W. A. Hudson, Chattanooga Gas Company, who was assisted by J. W. Lea, Atlanta Gas Light Company; C. B. Wilson, Little Rock Gas Company; and Lee Woodward, Zenith Gas System, Inc., of Alva, Oklahoma.

Under the general title of "Planning To Sell the New Construction Market," C. K. Patton, Dallas Gas Company, discussed "Metropolitan Markets," and W. S. Keenan, Houston Natural Gas Corporation, discussed "Small Town Markets."

Operating Section

Clayton L. Nairne, New Orleans Public Service Inc., presided over the Operating Section Meeting, which opened with an interesting exposition of "Trends in Distribution System Design" by E. L. Henderson, chief engineer, United Gas Corporation, Houston.

W. C. Voight, general foreman of mains, Birmingham Gas Company, spoke on "The Economics of Mechanical Equipment for Underground Construction."

"Detecting and Repairing Underground Distribution System Leakage" was covered by R. A. Puryear, Jr., Alabama Gas Company, Anniston, Alabama.

Under the general heading of Metering, B. F. Worley, United Gas Corporation, Houston, gave a report on "Field Testing of Large Positive Displacement Meters." Future developments in meters were discussed by Norton McKean, president, American Meter Company, Albany, New York, who spoke on "Gas Meters of Tomorrow." W. H. Ligon, Atlanta Gas Light Company, presented the subject, "Sizing and Installing Meters on Residential Consumers' Premises."

"Pressure Control as a Means of Holding Low Pressure Distribution System Investment at a Minimum" was the subject of a paper presented by H. M. Blain, Jr., New Orleans Public Service Inc.

Industrial and Commercial Section

A. B. Banowsky, United Gas Corporation, Houston, presided over the Industrial and Commercial Section Meeting, which opened with personal comments by Maurice Myers, Office of War Utilities, War Production Board, Washington, D. C., and Lt. Col. L. O. Vogelsang and Major D. W. Reeves of the Eighth Service Command, U. S. Army, Dallas, Texas.

F. J. Evans, F. J. Evans Engineering Company, Birmingham, gave an interesting report on "Special Industrial Equipment Used for War and Its Possibilities for Use in Peace."

"Natural Gas as a Chemical Raw Material" was the subject of a paper prepared by James E. Pew, Director, Natural Gas and Natural Gasoline Division of P.A.W., and Frank H. Dotterweich, Dean of Engineering, Texas College of Arts and Industries, and Consultant for P.A.W. The paper was presented by Mr. Dotterweich.

A glimpse into the future development of commercial gas cooking equipment and the postwar market was presented by E. J. Shermire, Detroit-Michigan Stove Company, Detroit, Michigan.

Dr. W. R. Hainsworth, Vice-President, Servel, Inc., New York, spoke on "Some Fundamentals of Refrigeration by Gas."

"The Dehydration of Cereal Grass and Other Forage Crops and Their Potential Application to the South" was presented by Bruce Varney, Cerophyl Laboratories, Inc., Kansas City, Missouri.

Accounting Section

Oakah L. Jones, Oklahoma Natural Gas Company, Tulsa, Oklahoma, presided over the Accounting Section meeting, which consisted of informal panel discussions on timely subjects pertinent to accounting procedure. There was wide participation in discussions on "Future Personnel Problems," "Selecting and Training of Personnel," "Maintenance of Office Procedure Manuals," "Postwar Reserve Allowances," "Current Status of Wage and Salary Stabilization Program," "The Commercial Office Procedure," "Applying Cost Accounting to Utilities," "Non-Taxable Income of Certain Industries With Depleting Resources."

Home Service Section

The Home Service Meeting was a luncheon and round-table discussion with Cephalie Lewis, Atlanta Gas Light Company, presiding.

The course of future Home Service activities was plotted by Mildred Clark, Oklahoma Natural Gas Company, Tulsa, Oklahoma, in a talk entitled "Leads for Tomorrow."

Joie Kammer, New Orleans Public Service Company, discussed "Visual Aids in Demonstrations."

The 1944 home canning program was outlined for the meeting by Albertine Berry, Lone Star Gas Company, Dallas; Emma Wood, Louisiana Public Utilities, Covington, Louisiana; and Sammie Burton, Mississippi Power & Light Company, Jackson, Mississippi.

The Home Service Section meeting adjourned early to join the Sales Conference Section.

A.G.A.E.M. Annual Meeting in May

MANUFACTURERS of gas equipment will hold their annual meeting at the Palmer House, Chicago, May 8 and 9, it has been announced by Leigh Whitelaw, managing director of the Association of Gas Appliance and Equipment Manufacturers. General sessions will be held in the morning and the afternoon of each day and will be devoted to divisional meetings.

Col. Willard F. Rockwell, A.G.A.E.M. president and president, Pittsburgh Equitable Meter Company, will preside and make the opening address. The first general session will include election of officers, the treasurer's report by John Van Norden, American Meter Co., and addresses by Ernest R. Acker, president, American Gas Association, and Major Alexander Forward, managing director, A. G. A.

Other features of the first general session will be a talk on "Domestic Gas Research" by Everett J. Boothby, chairman, A. G. A. Domestic Gas Research Committee, and vice-president and general manager, Washington Gas Light Co., and a description of the gas industry's coordinated kitchen drive by C. V. Sorenson, director of this program.

Elmer Wheeler, noted humorist, philosopher and master salesman, will make the principal address at the dinner meeting on May 8.

The second general session opens with a report on "Postwar Planning" by Frank H. Adams, chairman, A.G.A.E.M. Postwar Planning Committee. Henry H. Morse, chairman, Industry Publicity Committee, and vice-president, Florence Stove Co., will speak on "Without Profit We Perish." The topic of "Warfare to Welfare" will be presented by Russell G. Creviston, chairman, Producers' Council Postwar Planning Committee, and director, trade and public relations, Crane Co. Frank B. Boice, Shell Oil Co., director, Liquefied Petroleum Gas Association, will discuss "The Future of the LP Gas Industry." A report by Managing Director Whitelaw will conclude the session.

New England Gas Association Officers

1944-1945 officers of the New England Gas Association. Left to right, front row: Hall M. Henry, Cambridge, president; N. B. Bertolette, Hartford, retiring president; D. S. Reynolds, Boston, first vice-president. Back row: E. H. Eacker, Boston, treasurer; Clark Belden, Boston, executive secretary; L. E. Knowlton, Providence, second vice-president

Bland Heads Mid-West Gas Association

C. A. BLAND, Iowa Power and Light Company, Des Moines, Iowa, was elected president of the Mid-West Gas Association at the thirty-ninth annual meeting of that organization held April 5 in Des Moines.

Other new officers named at the meeting are: first vice-president—Burt R. Bay, Northern Natural Gas Co., Omaha, Nebraska; second vice-president—E. Clark Deane, Central Electric & Telephone Co., Sioux Falls, S. Dak.; secretary-treasurer—R. B. Searing, Sioux City Gas & Electric Co., Sioux City, Iowa (reelected).

Watson E. Derwent of Rockford, Ill., and Carl F. Asendorf of the American Meter Co., Chicago, were elected honorary members.

Major Alexander Forward, managing director, American Gas Association, speaking at the meeting, reviewed the gas industry's status to date pointing out that the number of gas customers has steadily increased in peace and war. He averred that the industry faced the postwar period with confidence and had little to fear in the reconversion period.

"The public utility," Major Forward said, "is more fortunate than most others for the reason that our operating technique is basically unchanged, our plants and distribution systems are practically intact, our production has not undergone fundamental alterations like, for instance, the automotive industry, and our corporate structure is substantially the same." He added that the gas industry is more fortunate than other utility industries "because we have kept our feet on the ground, remained out of politics and have not been swayed by passing winds of passion and rhetoric."

Wisconsin Meeting

THE Wisconsin Utilities Association will hold a general conference of all its sections—gas, electric, accounting and transportation—on May 19 at the Pfister Hotel, Milwaukee, A. F. Herwig, executive secretary, announces. This conference replaces the usual separate conventions of the four sections.

CONVENTION CALENDAR

1944

MAY

May 1-4 **U. S. Chamber of Commerce**
Waldorf Astoria Hotel, New York, N. Y.

2 **Pennsylvania Gas Association Annual Meeting**
Philadelphia, Pa.

8-9 **Association of Gas Appliance and Equipment Manufacturers Annual Meeting**
Palmer House, Chicago, Ill.

8-11 **National Fire Protection Association**
Philadelphia, Pa.

11-13 **Natural Gas Spring Conference, American Gas Association**
French Lick Springs Hotel, French Lick, Ind.

15-16 **Indiana Gas Association**
Hotel Lincoln, Indianapolis, Ind.

15-18 **Natural Metal Trades Association**
Hotel Biltmore, New York, N. Y.

19 **Wisconsin Utilities Association—General Conference**
Pfister Hotel, Milwaukee, Wisc.

19-20 **Gas Meters Association of Florida and Georgia**
Miami Beach, Fla.

24-25 **American Management Association Insurance Conference**
Hotel New Yorker, New York, N. Y.

JUNE

June 6-7 **American Gas Association Joint Production and Chemical Committee Conference**
Hotel Pennsylvania, New York, N. Y.

6-8 **Southwestern Gas Measurement Short Course**
University of Oklahoma, Norman, Okla.

8 **Canadian Gas Association 37th Annual Convention**
Royal Connaught Hotel, Hamilton, Ontario

8 **American Management Association Annual Meeting**
Hotel Pennsylvania, New York, N. Y.

19-22 **American Society of Mechanical Engineers**
Pittsburgh, Pa.

19-23 **American Home Economics Association Annual Meeting**
Hotel Stevens, Chicago, Ill.

27 **American Gas Association Conference on the Operation of Public Utility Motor Vehicles**
Hotel Bellevue-Stratford, Philadelphia, Pa.

OCTOBER

Oct. 3-5 **National Safety Congress**
Sherman, Morrison & La-Salle Hotels, Chicago, Ill.

Pennsylvania Gas Meeting to Be Held May 2

THE thirty-sixth annual meeting of the Pennsylvania Gas Association will take place May 2 at the Benjamin Franklin Hotel, Philadelphia. In addition to morning and afternoon business sessions, the meeting will include a luncheon and banquet.

Among the speakers will be: R. D. Calkins, dean, School of Business, Columbia University; Ernest R. Acker, president, American Gas Association; Hudson W. Reed, president, The Philadelphia Gas Works Co.; H. Carl Wolf, president, Atlanta Gas Light Co.; Major Alexander Forward, managing director, A. G. A., and Edmund Collins, Jr.

W. G. B. Woodring, operating manager, Allentown-Bethlehem Gas Co., is president of the Association.

List Essential Gas Industry Personnel

DURING the early winter, Lists of Critical and Essential Occupations of the Natural Gas and of Manufactured Gas Industries were prepared at the suggestion of the Office of War Utilities of the War Production Board. These lists were prepared under the supervision of the gas industry's Task Committees, and were submitted to the Office of War Utilities on January 29, 1944.

The lists include classifications, definitions, minimum educational, experience and physical requirements for any job pertaining to the gas industry listed in any of the eight or nine different applicable governmental Critical and Essential Occupations List. In addition certain recommendations are made for the inclusion of additional occupations.

These proposed lists were submitted by the Office of War Utilities to the War Manpower Commission for their review, criticism and decision as a means of securing some relief in the maintenance of critical and essential personnel in the gas industry.

Member companies may secure copies by addressing J. W. West, Jr. Secretary, Committee on War Activities, Association Headquarters.

Utilities Win National Security Awards

THE National Security Award has been granted to 34 additional plants and facilities for superior plant protection and security organization, the U. S. Office of Civilian Defense announced recently. Among those so honored are the following: Florida Power & Light Co., Dade County (Southern Division), Miami, Fla.; Birmingham Gas Co., Birmingham, Ala.; Consolidated Gas Electric Light and Power Co., Baltimore, Md.; American Stove Co., St. Louis, Mo.; and Virginia Electric & Power Co., Richmond, Va.

Accounting SECTION

O. H. RITENOUR, *Chairman*
C. E. PACKMAN, *Vice-Chairman*
O W BREWER, *Secretary*

Reducing Government Questionnaires Through Utility Subcommittees

By DAVID J. GUY

Assistant Manager, National Resources Department, United States Chamber of Commerce, and Secretary of Public Utilities Subcommittees of the Advisory Committee on Government Questionnaires

IT is a little over a year now since the Advisory subcommittees on Government Questionnaires to Public Utilities were organized. Modestly and quietly these committees have been at work, on a voluntary basis, and in an advisory capacity, all with a view to reducing to a minimum the time and labor that their particular industry must devote to Government Questionnaires. Very substantial results have been accomplished, the effects of which in many instances will not terminate with the war emergency, but will continue as a permanent saving. As will be seen, these subcommittees operate largely on their own volition and without restraint since they are only advisory in character. Their field of activity is not channeled and they may dig in almost any place they suspect economies in reporting can be made.

A recent action by the Securities and Exchange Commission provided that, with respect to its Form U-14-3, its Annual Report for Registered Holding Company, 10 schedules may be omitted.[1] The Commission, at the same time approved a set of supplemental instructions relating to Form U-5S, the Annual Supplement to the Registration Statement, the effect of which is to substantially reduce the reporting burden on respondents.[2]

These actions by the Securities and Exchange Commission parallel similar earlier actions by the Federal Power Commission concerning its annual report Forms Nos. 1 and 2 from Public Utilities and Licenses, and from Natural Gas Companies respectively, and its Power System Statement. Other improvements have also been made by the War Production Board with respect to data required from the utility industry.

I believe the utility industries will be interested to learn something of how these improvements are being achieved; who initiates the changes in reporting requirements of federal agencies; and what the mechanism, the procedure, is that concerns itself with this subject. This is no occasion to applaud results or to compliment those who have achieved them. Rather it is intended to convey to the industry some conception of a little known activity and also, by the same token, a little known opportunity that is still available for accomplishing some much needed curtailments and revisions in reporting practices.

Cleveland Conference

The Annual Spring Accounting Conference of the gas and electric industries took place at the Hotel Cleveland, Cleveland, Ohio, April 25-27, too late to report in this issue of the A. G. A. MONTHLY. A complete account will appear in the June issue.

Origin of Control Over Data Collecting

Almost every governmental function needs industry data as a basis for the determination of policies, or as tools for policy effectuation. Generally, as the functions of the Government increase, there is need for additional information.

The utility industry, long in the habit of reporting to Government—for other reasons, perhaps, than its exposure to the "gold-fish bowl" influence—has been the object of more Report Forms than perhaps any other industry. Yet, notwithstanding the fact that it has long been geared to prepare and file reports, the influences of war have increased the number of reports required from utilities, and at the same time reduced the manpower available to provide the required information.

The Federal Government has long recognized the need for coordination of the statistical activities of the Federal agencies.[3] Not until the end of 1942, however, were the limitations upon the data-collecting activities of the Federal agencies made crystal-clear. On December 24, 1942, the President approved Public Law 831 of the 77th Congress, known as the Federal Reports Act of 1942.

This law declares it to be the policy of Congress:

"that information which may be needed by the various Federal agencies should be obtained with a minimum burden upon business enterprises (especially small business enterprises) and other persons required to furnish such information, and at a minimum cost to the Government, that all unnecessary duplication of efforts in obtaining such information through the use of reports, questionnaires, and other such methods should be eliminated as rapidly as practicable; and that information collected and tabulated by any Federal agency should insofar as is expedient be tabulated in a manner to maximize the usefulness of the information to other Federal agencies and the public."

The Act was more than a declaration of policy. It makes it mandatory upon all Federal Agencies to "clear" in advance with the Bureau of the Budget before they embark upon any data-collecting venture.[4] Moreover, by the terms of the Act, and more specifically by the provisions of Regulation A, issued thereunder by the Director

Reprinted from Edison Electric Institute Bulletin, April, 1944.

[1] The schedules involved are: Nos. 107—Miscellaneous Investments; 110—Sinking Funds; 111—Miscellaneous Special Funds; 116—Special Cash Deposits; 117—Temporary Cash Investments; 118—Notes Receivable; 122—Other Current Assets; 160—Notes Payable; 167—Other Current Liabilities; 245—Other Interest Deductions.

[2] Among a number of others, the changes reduce the amount of reporting previously required by Items 16(a) and 16(b) with respect to individuals who are compensated entirely by a registered holding company; Item 16 (g) 3, the data required to be furnished as to payments or contributions for advertising, etc., as well as 16 (g) 1 and 16 (g) 2; sub-item 6 of Item 6 relating to damage suits, and Exhibit D.

[3] In 1908 President Theodore Roosevelt by Executive Order 937 established an interdepartmental statistical committee. During the first World War a Central Bureau of Planning and Statistics was organized under the War Industries Board. In 1919 its functions were transferred to the Bureau of Planning and Statistics. In 1929 a Federal Statistics Board was established. This was succeeded in 1933 by the Central Statistical Board, established by Executive Order issued by President Roosevelt, and later, in 1935, given statutory authority for a trial period of 5 years. In 1939, President Roosevelt transferred the Board's functions and its staff to the Bureau of the Budget, under the Reorganization Act of that year. At present, the Division of Statistical Standards, in the Bureau of the Budget, derives its authority from the Budget and Accounting Act, 1921, as does the rest of the Budget Bureau, from Executive Order No. 8248 of September 1939, which defines the functions and duties of the several parts of the Executive Office of the President, from its status as a part of the staff arm of the President, as well as from specific legislative action—the Federal Reports Act of 1942.

[4] There are a few notable exceptions: Bureau of Internal Revenue, Comptroller of the Currency, bank supervisory agencies, and similar other organizational units.

of the Bureau of the Budget, the collection of information is made broad so as to include application forms, administrative forms, questionnaires, telegraphic requests and other similar devices for the collection of data when 10 or more respondents are involved.

Thus, the regulations embrace priority applications, questionnaires used a single time for a research purpose, annual or other report forms used for administrative purposes by regulatory agencies, telegraphic or telephonic requests for a statistic, as well as record-keeping requirements, including systems of accounts and systems of classification which are to be used or capable of being used for the collection of information.

Advisory Committee Appointed

Just in advance of the approval by the President of the Federal Reports Act of 1942, perhaps anticipating such action by Congress, Harold D. Smith, Director of the Bureau of the Budget, wrote to a number of national organizations requesting "the counsel of those who are intimately aware of the problems to which governmental requests for information give rise in business offices."[5]

Thus the Director of the Bureau which is charged with the responsibility of planning and promoting the improvement, development and coordination of Federal and other statistical services, sought the advice of the business community. And business, particularly certain segments thereof, has been quick to accept the offer, to the mutual benefit of both business and Government.

To be sure, businessmen endorse the idea that the Government can no more operate successfully in a vacuum of facts than can business. Each must act on the basis of observed facts rather than on unsupported hunches. The Budget Bureau's invitation to business to counsel with it was "in order to assist in evaluating the necessity for the questionnaires which it must clear, and to weigh such necessity in the balance which the requests impose upon business and industry."[6]

The committee formed by the participating associations is called The Advisory Committee on Government Questionnaires. Organized in March, 1943, it maintains liaison offices in Washington, through which its members and those of its subcommittees cooperate with the staff of the Bureau of the Budget.

The functions of this Committee are exclusively advisory to the Budget Bureau, and unlike many advisory committees which are appointed by a department or other agency of the Government, the personnel of this committee was appointed by and is responsible only to the business community.

The Advisory Committee operates largely through subcommittees, each organized along well defined lines. "The charter of operations," says the Committee's 1st Annual Report, "is in some cases restricted exclusively to a single industry, as for example questionnaire problems of the arc-welding industry; in other cases there are sub-committees which represent segments of an industry such as the organic chemical industry, or a segregated part of an industry, as for example problems of accounting questionnaires of the public utility industry; and in other cases subcommittees have been formed to devote their attention to subject matter or functional problems that affect many lines of business, as for example WPB-732, the Manning Table and Replacement Schedule questionnaires, or Forms A and B of the Office of Price Administration."

Organization of Utility Industry Sub-Committees

The public utility industry, including gas, electric and water utilities, and both the publicly and privately owned parts thereof, were among the first participants in this industry advisory activity.

The Advisory Committee gave consideration to the questionnaire problems of the utility industry at its February 9, 1943, meeting when it authorized an exploratory meeting be held to which were invited representatives of all the national associations in the utility industry. This group met in New York City on March 19, 1943, on the call of W. J. Donald, Chairman of the Advisory Committee.[7] At this meeting, decision was made to organize three subcommittees, each to devote itself to a separable problem. These subcommittees were:

1. Financial and Accounting
2. Materials Controls
3. Engineering and Facilities

Each of these subcommittees has been active in its own field, and the amount of activity, either formal or informal, has been directly reflected in two important directions—one curative, the other preventative. First, there have been material and substantial improvement in both questionnaires and reporting requirements, some of which had been of long-standing; second, the very existence of the subcommittees has given pause to the drafters of questionnaires. It is the policeman-on-the-corner idea.

Very active, and result producing is the Financial and Accounting subcommittee, the first to be organized. It may be properly said that this group is not only the most active of the three subcommittees, but in the annuals of the Advisory Committee is one of the most active of 40 odd subcommittees. Its members are W. T. Neel (Philadelphia Electric Company) Chairman; H. D. McDowell (American Water Works and Electric Company); A. W. Hatch (Ebasco Services); Harvey S. Pintsch (Virginia Electric and Power Company); Otto Price (Boston Consolidated Gas Company); and E. K. Higley (Middle West Service Company).

This subcommittee has held a number of meetings, and during intervening periods its members have been extremely active in research activities concerning projects which the committee had undertaken.

Notable among these were the studies undertaken of Report Forms of the Federal Power Commission and of the Securities and Exchange Commission. The objective manner in which it has dealt with assignments is attested by the consideration accorded the committee's recommendations by the Budget Bureau. It has "followed through" on these recommendations with the respective agencies, and they in turn, have accepted most of them.

Its work is by no means completed. Notwithstanding the substantial results already achieved, much remains to be done, not only from the point of view of obtaining for the industry reductions in needless paper-work as a war emergency, but long-range examinations of the systems of accounts and other record-keeping requirements, and permanent improvements in report forms. The extent to which this subcommittee can effectively perform its functions is in direct line with the extent to which the industry will funnel through its ideas, suggestions, criticisms, complaints and comment.

Less formal in its organization and operations, but equally as effective, has been the subcommittee on Materials Controls. This group,[8] under the chairmanship of Ernest R. Mitchell (Cincinnati Gas and Electric Company) has dealt exclusively and most successfully with orders, regulations and forms of the War Production Board (Office of War Utilities) and other war agencies. Mr. Mitchell through collaboration with his committee, others in the industry, the committee's secretary and the Budget Bureau's Staff has been active in dealing with the questionnaire problem at its source.

A method of measurement of this Committee's work has yet to be devised. On one assignment alone, it has been estimated that a reporting requirement initiated by a Federal agency and disapproved by the

---

[5] At present there are seven (originally five) participating organizations namely: American Retail Federation, American Trade Association Executives, Chamber of Commerce of the United States, Controllers' Institute of America, National Association of Commercial Organization Secretaries, National Association of Manufacturers, and National Industrial Council.

[6] From the First Annual Report of the Advisory Committee on Government Questionnaires. Copies of this report are available on request to the Committee addressed to 1615 H Street, Northwest, Washington (6), D. C.

[7] Attending this exploratory meeting with Mr. Donald, were the following: W. G. Bourne, Jr., Treasurer, The Commonwealth and Southern Corporation; W. N. Lewis, Director of Statistical Department, Electric Bond and Share System; W. T. Neel, Auditor, Philadelphia Electric Company; R. B. Freeman, Chief Engineer, American Water Works and Electric Company; Steve C. Tate, President, National Rural Electric Cooperative Association; Glen Forster, Controller, Brooklyn Union Gas Company; Kurwin R. Boyes, Secretary, American Gas Association; Harry A. Jordan, Secretary, American Water Works Association; David E. Cohn, representing the Bureau of the Budget; and David J. Guy, Chamber of Commerce of the United States, representing the Advisory Committee.

[8] Besides Mr. Mitchell it includes: Harry E. Jordan (American Water Works Association); A. E. Moore (Philadelphia Gas Works Co.); W. P. McArdle (Ebasco Services, Inc.); E. J. Rowe (Supt. Water & Light Dept., Wellesville, N. Y.); George N. Reed (Hope Natural Gas Co.); E. J. Stoneman (National Rural Elec. Cooperative Association); J. M. Imlay (Washington Gas Light Co.).

Budget Bureau involved a saving to the industry of 840,000 man-hours.

The third subcommittee, relating to Engineering and Facilities has been only recently activated. Two of its present members, however, have been active for some time. They have participated in negotiations with the Federal Power Commission (through the Budget Bureau) as to changes in the Annual Power System Statement. J. R. Baker, Pennsylvania Water and Power Company, and G. H. McDaniel, American Gas & Electric Service Corporation, cooperated with Mr. Neel, Chairman of the Accounting and Financial Subcommittee, on those matters outside the purview of the finance group, prior to organization of the Engineering and Facilities Subcommittee.[9]

Revisions in the Annual Power System Statement, as in the case of the aforementioned report forms, have been characterized as being of substantial benefit. Some of the revisions are of a clarifying nature, and because of the hitherto existing ambiguities, needless hardship was frequently imposed on the respondent systems. A notable case in point was the statement's Schedule 18A, System Maps and Diagrams. The previous requirement has been variously interpreted by systems as requiring four sets each of dozens (sometimes scores) of maps, sketches, and one-line diagrams. This requirement was, by reason of the Committee's recommendations, changed to two copies each of seldom more than three maps. A number of other changes in schedules were similarly revised, and the burden correspondingly reduced.

Control Air-Tight and Fool-Proof

The effectiveness of the Budget Bureau's review process and of its mechanism for assigning approval numbers and expiration dates affords an unparalleled opportunity to business and industry to be heard during the formative stages of new questionnaires, or when existing forms are reexamined.

The Budget Bureau's regulations require that every authorized Federal form, or other data request, must bear a Budget Bureau approval number, and in most instances an expiration date. Whenever a form is received without an approval number thereon, there is a fair presumption that the form has not been reviewed and that the form has not been authorized. Such cases should be reported for attention or advice to either the Budget Bureau or to the Advisory Subcommittee concerned.

The expiration dates on forms mean that the forms will be obsolete beyond that date unless they are again submitted and approved, in which event a new date is assigned. The date serves as advice to respondents, not only as to the life of temporary or short-term forms, but as to the date in advance of which the review of the form is again undertaken. It has been found that frequently a form is designed to serve a well defined useful purpose, but that long after the original need has ceased to exist the form remained in effect. On other occasions, even though the usefulness of the original need continued, there were refinements, modifications and clarifications that seemed desirable. These reexaminations at periodic intervals are thus possible, and respondents to governmental requests for information are urged by the Bureau of the Budget to make their comments known.

While the accomplishments during the first year of activities of the utility subcommittees are not being evaluated in terms of dollars or man hours saved to the industry (if indeed they are capable of being so evaluated), there is abundant testimony of the value of collaboration and cooperation. One mid-West utility company official has declared that their current expenditures for preparing returns on governmental forms is at a rate of $5,000 a month less than a year ago. Another has praised the procedure by which he "can be heard by a friend at court." Besides these positive gains, another has spoken eloquently of the opportunities which the Advisory Committee and its subcommittees offer through working with the Budget Bureau.

It is to be remembered that the utility industry has benefited, not only through the direct action of its subcommittees (the three devoted to utility forms) but through the action of other groups who work on the review of forms that cut across all industrial lines. The committees who have devoted themselves to labor forms, to accident and health reports and others, many of which include utility companies among respondents, have also served the industry well.

No review of the utility subcommittee activities would be complete without acknowledgement of the several prime movers in this economy effort, without whose zeal and self-effacing activity this first chapter could not be written. On the side of the Bureau of the Budget there are Dr. Stuart A. Rice, Assistant Director in Charge of Statistical Standards, and his able assistant, William R. Leonard, who have given freely of their time and talents to the industry's problems. Peyton Stapp, Clearance Officer of the Division of Statistical Standards, and David E. Cohn, the Division's utility specialist, have also rendered invaluable assistance. Mr. Cohn, through years of experience in State Commission Regulation, and more recently with the Federal Power Commission, brings to his task an intimate knowledge of the subject matter involved.

William J. Donald, Chairman of the Advisory Committee, and Russell W. Schneider, its Executive Secretary, have also shown a special interest in the questionnaire activities relating to utilities. There has also been every cooperation with committees of the Edison Electric Institute and American Gas Association. The staff of the Federal Power Commission has been especially helpful, and the fine relationships with it and that of the Securities and Exchange Commission augurs well for the future.

Congress has charged the Bureau of the Budget with a grave responsibility and the Bureau has wisely turned to industry for assistance in discharging this responsibility. Industry's opportunity to help itself is by no means exhausted, and a little head scratching along this line now may prevent head aching in the future.

[9] Other members are: Merle Rainey (Edison Elec. Institute); W. C. Huebner (Ebasco Services); Harry Jordan (America Water Works Assn.); Adam N. W. LaRose (Allentown-Bethlehem Gas Co.); Malcolm Barton (Hartford Elec. Light Co.); R. M. Cooper (S. C. Pub. Service Authority); Clyde T. Ellis (Natl. Rural Elec. Coop. Assn.).

TESTING GAUGES

(Continued from page 202)

correct, readings are noted under which the required temperatures may be attained.

The disadvantage of this method of testing is the time required for the test. The accuracy cannot be questioned. However, it is planned, now that master gauges are to be made available, to employ the use of a master gauge for initial testing. If inaccuracy of the canner gauge is encountered the thermometer method may still be used for checking purposes.

West Texas Gas Company, Lubbock, Texas—Early in the spring of 1943, it was announced at the area food preservation institute that gauges could be tested at the gas company, and Mary Alice Crosson, the home service director, indicated that even with this small amount of publicity, as many as fourteen pressure canners were brought in in one day. Many of these had not been used for years. Therefore, the owners were anxious to know the condition of the gauges and safety valves. Resident Engineer R. N. Curry prepared a temperature pressure compensation chart for atmospheric pressure for the altitude in West Texas—compensating for error in the gauge itself and compensating for the difference in pressure necessary to give the correct temperature. The home service department tested the gauges with maximum thermometers according to the method given by the State Extension Service and similar to the plan described above. J. S. Whitis, superintendent of measurement, tested safety valves and some of the pressure gauges with the laboratory test gauge.

The question has been raised as to whether a customer getting a gauge tested would be asked to sign a release. Inquiries made to the companies whose methods have been described indicate that this has not seemed necessary.

In plans for 1944, manufacturers of pressure canners announce that they have been given authority to manufacture gauge testers this year. The price given by one manufacturer is $7.50 delivered and time of delivery may vary from 4 to 6 weeks after receipt of order.

A Residential Gas Sales Promotion Program

By RALPH P. WAGNER

Commercial Manager, New York Power and Light Corp., Albany, N. Y.

BECAUSE many of you may not be too familiar with our operation, let me describe briefly our situation. New York Power and Light Corporation is a combination electric and gas utility serving an area of approximately 7,500 square miles in the Hudson and Mohawk River Valleys in East Central New York State. The principal cities served are Albany, Troy and Schenectady; Albany the largest, having a population of approximately 140,000. Except for one isolated unit in the city of Hudson, all gas has a heat content of 537 B.t.u. and is produced in a modern coke oven plant at Troy. In all, gas is delivered to 24 cities and villages, ranging in population from 2,000 to 140,000. Residential gas customers with and without heat, total approximately 129,000. As you can see, this is definitely not a metropolitan operation but a fairly well scattered low density system.

Turn to Dealer Promotion

Prior to 1935, we promoted the utilization of gas by residential customers through the medium of direct appliance merchandising. Studies convinced us that dealer representation of gas appliances in the many trading centers of our area would develop to the point that we might more effectively promote the use of residential gas service if we retired as a competitor in the merchandising field, and devoted our entire energies to the further development of dealer distribution. Therefore, company merchandising was discontinued and a dealer promotion program was developed. In general, the major objectives of the program were to assume the task of developing customer acceptance for gas as the ideal domestic fuel and to cooperate in the development of retail agencies to sell gas-using appliances.

It was recognized that experience alone would prove or disprove the assumption made, and that it would be necessary to check results carefully. After the first year of operation, two facts were obvious:

(1) Dealer sale of customer-accepted appliances (gas ranges) exceeded the total of such sales made by dealers and the company during the previous year.

(2) Dealer sale of appliances still in the promotional stage (automatic water heater and gas house heating equipment) were considerably less than the previous year's sale by the company.

Therefore, beginning with the year 1936, a company rental program was introduced on conversion equipment for water heating and house heating. All installations were made by dealers at a contract price which was quite satisfactory to them. You will recall that at this time money was tight and that retail prices of factory built water heating and house heating equipment were particularly high. This program was always considered by us, and explained to the trade, as a transitory activity to create acceptance of gas for water heating and house heating.

It was determined at the beginning that when an adequate market had been established, and that when effective dealer outlets were established for factory built equipment, the conversion program would be discontinued. Therefore, a parallel program for the promotion of factory heater sales by the trade was operated concurrently.

The following tabulation of conversion rentals and factory sales during the succeeding five years indicates the progress made in that direction:

	Gas Water Heater Sales			
	Company Sales Conversion	*Dealer Sales Factory-Built*	*Total Sales*	*Dealer Sales in % of Total*
1936	3,398	439	3,837	11.15
1937	4,146	921	5,067	18.17
1938	2,741	1,140	3,881	29.37
1939	2,333	1,172	3,505	33.43
1940	2,420	1,566	3,986	39.28

Program 1938-1940

During the period that we are discussing, 1938 through 1940, we were therefore pursuing an intermediate type of residential gas promotion program insofar as water heating and space heating were concerned. Not direct merchandising, not exclusively a dealer cooperative program, but a combination of the two extremes. However, recognizing that our conversion equipment rental program was basically one of market development, it is true that our over-all program was of the dealer promotion type.

The activity was implemented by a staff of district representatives, approximately one for every 4,000 residential gas meters, who systematically canvassed their territories to promote customer acceptance of gas for all domestic uses, and to assist the trade in the sale of factory built equipment, or to rent conversion equipment for water heating and house heating. Representatives were compensated on a relatively large base salary and small incentive bonus based on total water heater and house heating factory and conversion equipment installed in their territories, either by the company or by the dealers. The bonus for factory-built sales was approximately twice the bonus for conversion rentals.

Continuous dealer contact was maintained by a supervisor in each area; appliance demonstration service in the home, and in dealers' stores being available to all dealers.

Statistics on M.C.F. per customer, and Gross and Net Revenue per customer, when considered by themselves only, tell a rather discouraging story. Use and revenue per customer remained practically constant at 28 M.C.F. and $31 respectively. New business expense fell from $2.30 to $1.70 per customer.

These figures paint only part of the picture. Just before the effect of a wartime economy became apparent, beginning with the introduction of Regulation W in September 1941, it was believed that considerable progress had been made in the long range program of market development and dealer promotion. Dealers in increasing

Presented before Sales Managers' Conference of the New England Gas Association, Boston, Mass., February 25, 1944.

numbers had accepted factory gas water heaters as a merchandising item with profit possibilities. Retail prices on factory-built equipment over a period of years had decreased to the point that they were more salable.

Gas range sales by dealers progressed each year as follows:

1936	5,573
1937	5,891
1938	6,374
1939	6,440
1940	7,488

The basic needs for the conversion program that originally existed were no longer controlling factors and the sales figures previously quoted indicate that, within a comparatively short time, we might have discontinued the conversion rental activity, even under normal conditions.

What In 194X

We all know that aggressive promotion of residential use of gas will be essential after the war to:

Offset habits of curtailment practiced during the war, and to re-establish an upward trend of average residential use. Combat the promotional efforts of competitive services. Capitalize on the anticipated accelerated residence construction program. Create additional domestic revenue to offset lost war production industrial revenue.

If, in our activity, we follow the trend that has been established, we will organize after the war on a complete dealer promotion basis and refrain from any direct sales program. However, conditions prevailing when peace is restored will dictate the ultimate decision. Density of dealer representation, aggressive promotion by a larger number of manufacturers, price and quality of products available, and economic conditions are some of the unknown factors. Like all other utilities, we have "Postwar Planned" in many directions, but realize that definite conclusions will have to be deferred.

Mid-West Sales Managers' Round Table Forum

A GROUP of 38 top-flight gas utility sales executives attended the Mid-West Regional Gas Sales Managers' Round Table Forum on Residential Gas Sales, held at the Palmer House, Chicago, Illinois, on April 6, 1944.

W. M. Chamberlain, chairman, A. G. A. Domestic Range Committee of the Residential Gas Section, discussed the various competitive factors in the postwar range situation and reviewed the CP Range Better Business Building Plan, which has recently been made available to the gas industry.

C. V. Sorenson, chairman, Residential Gas Section, outlined the activities of the Section's committees for the balance of the year and gave a complete resumé of the Coordinated Gas Kitchen Program of which he is the director.

F. M. Rosenkrans, chairman of the Committee on Improving Domestic Gas Appliances, reviewed the results of the Postwar Gas Appliance Survey as it related to gas ranges. In addition to giving the national rankings on the questions asked in the questionnaire, Mr. Rosenkrans also discussed the difference between these rankings and those of the East North Central and West North Central states.

George S. Jones, Jr., vice-president, Servel, Inc., discussed the current gas refrigeration production situation and the advertising plans of his organization. He emphasized the importance of sales training and advised that Servel seminars are being revised and brought up-to-date for use by the industry in the training of sales personnel postwar.

Jack R. Lavelle, chairman, Water Heating Division, A.G.A.E.M., reviewed the recent amendments to the Water Heater Order L-185, permitting the use of metal jackets and copper coils. He advised that gas utility companies may order water heaters under Order L-79 to build up their inventories as permitted in Order L-63. He further advised that the water heater manufacturers are engaged in working on postwar water heater models.

The meeting was sponsored by the A. G. A. Residential Gas Section and was under the direction of J. C. Sackman, chairman of the Mid-West Regional Gas Sales Council.

Home Service Conference in Kansas City

Home service experts who attended Kansas City meeting

ON Monday, March 13, the home service directors in the three gas companies—The Gas Service Company, The Kansas City Gas Company, and The Wyandotte County Gas Company—were called together in Kansas City by F. M. Rosenkrans, new business manager of The Gas Service Company. The meeting was held to discuss home service plans for the spring and summer, particularly as they refer to food preservation plans.

A round-table discussion brought in reports from the many towns and districts served by these three companies, and it gave opportunity to disseminate a variety of methods under way. Jessie McQueen, of the American Gas Association, discussed the general picture of food preservation, as has been described in the Home Service Committee questionnaire, the plans that seem to be evident for 1944, and also the details of the National Canning Conference called by the War Food Administration in Chicago in January.

War Conference on Industrial and Commercial Gas Is Outstanding Success

EXHIBITING a vitality that matched the rising tide of industrial and commercial gas sales, the 1944 War Conference held at Rochester, New York, Thursday and Friday, March 30 and 31, was an outstanding success. A record-breaking attendance of more than 300 registered delegates plus a large number of visitors took part in the proceedings which focussed national attention on the amazing progress of this branch of the gas industry. From a modest beginning in 1936, this conference has grown to impressive stature.

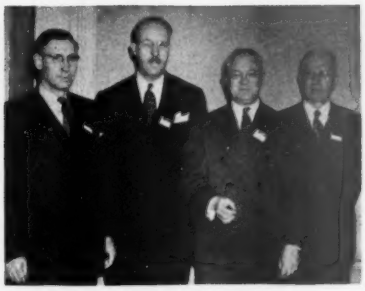
Attesting to the pyramiding significance of industrial and commercial gas in the war scene, a large number of government officials and Army officers took part in the conference. One of the principal speakers was Brigadier General Hermon F. Safford, chief of the production service branch, Office of Chief of Ordnance, Washington, D. C. who gave a vivid picture of American armament on the battlefronts. Major credit was given to gas-fired equipment for its part in making American ordnance the best in the world.

Under the capable handling of the chairman of the Industrial and Commercial Gas Section, Charles G. Young, manager, Springfield Gas Light Company, Springfield, Mass., ably assisted by the vice-chairman, Harry K. Wrench, president, Minneapolis Gas Light Co., Minneapolis, Minn., the meetings were conducted with clocklike precision. I. Lundgaard, manager, industrial gas department, Rochester Gas and Electric Corp., Rochester, was chairman of the Program Committee which had mustered an imposing array of talent.

F. Russell Howe, Rochester, and Harry A. Sutton, Newark

Assisting Mr. Lundgaard on the Program Committee were: R. Victor Bauer, Ebasco Services Inc., New York, N. Y.; Karl Emmerling, The East Ohio Gas Company, Cleveland, Ohio; Henry M. Heyn, Surface Combustion, Toledo, Ohio; F. B. Jones, Equitable Gas Co., Pittsburgh, Pa.; Ralph L. Manier, Central New York Power Corp., Syracuse, N. Y.; James C. Patterson, Carrier Corp., Syracuse, N. Y.; Leo Sullivan, Rochester Gas & Electric Corp., Rochester, N. Y.; and Eugene D. Milener, secretary, Industrial and Commercial Gas Section, New York, N. Y.

Noting that the full effect of last year's war production program resulted in a record use of gas for industrial and commercial purposes, Mr. Young, in his opening address, paid tribute to the ingenuity and resourcefulness of the gas industry. "To fully meet the impact of war and to expand our part in war production and mass feeding, required an all out effort on the part of industrial and commercial gas engineers and equipment manufacturers that has never before been matched," he said.

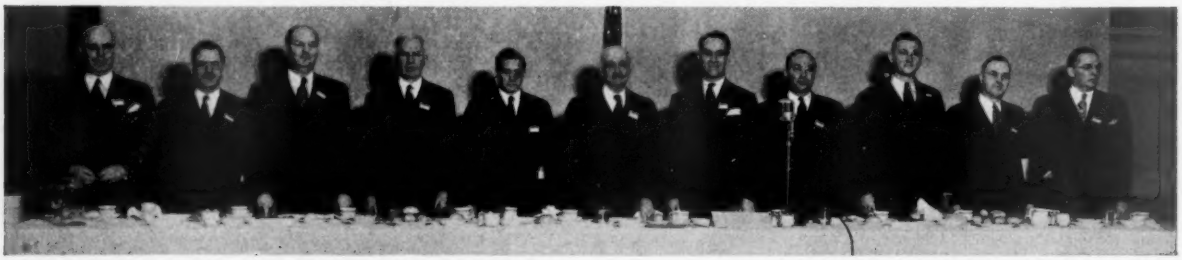


F. B. Jones, Pittsburgh; Emil Hofsoos, Pittsburgh; J. P. Leinroth, Newark; and B. H. Gardner, Columbus

Asserting that the huge building program, for new industrial plants and conversion of old plants, was essentially completed during the past year, Mr. Young said that "in 1944 every effort will be directed toward reaching the absolute maximum of daily capacity." His summary of the gas industry's role in war appears elsewhere in this issue.

Gas Air Conditioning Report

Following Mr. Young on the program, W. F. Friend, Ebasco Services Inc., New York, N. Y., reporting for the Joint Committee on Gas Summer Air Conditioning, presented valuable data covering field experience with gas-operated air conditioning installations. Supplementing the A. G. A. Laboratories investigation of design features



Speakers' table at the Thursday luncheon. Left to right: Eugene D. Milener, New York; Ivar Lundgaard, Rochester; Harry J. Holbrook, WPB, Washington; B. H. Gardner, Columbus; Vice-Chairman Harry K. Wrench, Minneapolis; Herman Russell, Rochester, principal speaker; Chairman Charles G. Young, Springfield; A. M. Beebee, Rochester; Frank H. Trembly, Jr., Philadelphia; Roy E. Wright, Cambridge; and E. J. Shermire, Detroit

Army and government officials in attendance at Conference

R. B. Grossman, Los Angeles, and Dolores R. Marconi, New York

C. B. Phillips, Toledo; J. P. Leinroth, Newark, and Eugene D. Milener, New York

Nelson R. Gorsuch, Indianapolis; and Charles M. Sieger, Hamilton, Ont.

and operating characteristics, reported in Research Bulletin No. 18, Mr. Friend dealt with investment costs, gas and electric consumptions, cooling water requirements, general performance, servicing requirements and customer satisfaction.

While present investment costs are higher, Mr. Friend stated that the objective is to bring the cost of an average 5-ton residential installation down to approximately $1500 or $300 per ton within two or three years after manufacture of improved models starts. Commercial installation costs reported in the survey ran about 20 per cent lower than residential. This was attributed to simpler duct systems, less cutting and patching, availability of space for equipment, better facilities for performing erection work and similar factors. Pointing out that customer satisfaction with units in operation is preponderantly good, he said that gas air conditioning rests on a sound basis for future progress.

A study of gas-fired air conditioning units in small commercial establishments in Washington, D. C., prepared by L. Bert Nye, Jr., air conditioning engineer of the Washington Gas Light Co., was distributed to delegates.

C. George Segeler, chairman, Aluminum and Magnesium Heat Treating Committee, described latest developments in heat-treating and melting aluminum and magnesium with gas. He called attention particularly to the comprehensive published report on this subject prepared by the subcommittee on Project No. 1 of the Metal Treating and Melting Committee, of which he is chairman.

Radiant Gas Burner Test

Mr. Segeler injected a new and interesting note into the conference when he presented results of an important test of radiant gas burners carried out in England. Rolls-Royce and the Derby Gas Light and Coke Company cooperated in a test of electric infra-red ray lamps versus radiant gas equipment for mold drying and core baking. This test showed the weakness of electric infra-red ray lamps for work of this kind which requires considerable penetration of the heat.

The radiant gas equipment, Mr. Segeler said, proved to be outstandingly superior. Apparently water can be most effectively evaporated from molds by infra-red radiation at one definite wave length (43,000 a.u.) corresponding to a panel temperature of 840° F. Mr. Segeler indicated that one large magnesium foundry and a well known

Speakers' table at the Friday luncheon. Left to right: Eugene D. Milener, New York; Vice-Chairman Harry K. Wrench, Minneapolis; Alexander Forward, New York; Dr. C. K. Mees, Rochester, guest speaker; Chairman Charles G. Young, Springfield; Brig. Gen. Hermon F. Safford, Washington, guest speaker; Herman Russell, Rochester; Col. Frank J. Atwood, Rochester; H. W. Milner, Washington; C. L. Brockschmidt, WPB, Washington; Col. A. J. Schamehorn, Rochester; and William R. Teller, Cleveland

steel foundry in the United States have scrapped electric infra-red ray core and mold drying systems for much the same reason and were now using gas.

In an interim report distributed at the conference, Carl Lekberg, Northern Indiana Public Service Co., Hammond, described the activities of the Committee on Heating Treating with Gas, of which he is chairman. This report indicates that the committee is concentrating on the problem of meeting competition from infra-red and induction heating.

The Thursday morning session closed with a thorough personnel study covering the industrial and commercial gas field presented by F. B. Jones, general sales manager, Equitable Gas Co., Pittsburgh. Pointing out that in both natural gas and manufactured gas companies the decline in numbers of sales personnel has been about 35% in the three-year period ending Feb. 15, 1944, Mr. Jones declared that much of the decline has occurred in the commercial field, where personnel losses ranged from 10 to 100% and averaged about 50 per cent. Stressed the necessity for greatly increased manpower in the postwar period and more effective training methods. His complete report will be published in an early issue of the MONTHLY.

Wartime Management

Featured speaker at the Thursday luncheon meeting was Herman Russell, president, Rochester Gas & Electric Corp., and past president, American Gas Association, whose address was enthusiastically received. Speaking on "Problems of Management in Wartime," Mr. Russell outlined the responsibilities of utility management and concluded with a two-fisted attack on the New Deal philosophy.

In discussing employee and employer relations, Mr. Russell said: "It is high time that we in this country came to realize that in any business, the interests of the worker and the owner are mutual." He added that every business is a cooperative one and "the business can thrive only if both parties have a square deal.

"Management must see that employees are well paid, have safe comfortable working conditions, are provided for in sickness, in death and in old age, through sick benefit insurance and pension plans." He also urged general adoption of profit-sharing plans to bring labor and capital, employee and employer closer together.

Mr. Young's outstanding record as chair man of the Industrial and Commercial Gas Section was recognized at the luncheon meeting when vice-chairman Wrench presented him with an engraved gavel made from a wooden gas main 74 years old.

Opening the Thursday afternoon session, Lawrence E. Biemiller, Consolidated Gas Electric Light & Power Co. of Baltimore, stirred the imagination of his audience by sketching a picture of gas uses in the development of industrial materials of tomorrow.

While steel continues to maintain its position as the leading engineering material, Mr. Biemiller predicted increasing competition from such newer products as plastics, synthetic rubber and plywood. At present steel has a productive capacity of 85% as compared with 8% for glass, the next largest industry. He declared that all trends are toward an increasing market for gas in the production and fabrication of steels as well as the newer products.

"Perhaps the most outstanding development in recent years in connection with industrial heating," Mr. Biemiller said, "has been the improvement in furnace mechanisms, robot controls, automatic charging, synchronized door operation, and speedy and automatic quenching. The greater the trend toward such furnace controls, the larger the field for the application of a controlled fuel like gas."

Food Service Promotion

Clarence Birdseye, Gloucester, Mass., originator of the Birdseye quick-freezing proc-

J. William Harrison, Hartford; C. F. Peterson, Chicago; E. C. Lundt, New York, and Roy E. Wright, Cambridge

ess for foods, predicted wider use of dehydrated, canned and quick-frozen foods in the postwar period. He told the gas men that the market for these foods is enormous and advised them to study the possibilities carefully.

Continuing the discussion of food problems, Frank H. Trembly, Jr. assistant sales manager, The Philadelphia Gas Works Co., on behalf of The Food Service Equipment Committee, made an important contribution to the conference on the subject of "Meeting Food Service Problems in a Changing World."

While noting that oil, coal and bottled gas may prove to be postwar competitors in certain situations, Mr. Trembly declared that "our present and ultimate competitor for the valuable food service load is electricity. Electric competition in the food service field is developing in the identical way that gas competition developed against coal 30 or more years ago. Gas was first used in coffee urns, steam tables, short-order stoves and broilers. With this background of customer acceptance, gas then invaded the coal range field, with the result that coal has been practically eliminated from the kitchen.

"In like manner," he continued, "electricity has made a successful entrance into this field through counter appliances, and its program has been accelerated by the acceptance of electric roll warmers, dry steam tables, deep-fat fryers and bake ovens. In the postwar period we can expect them to direct their full attention to the heavier kitchen appliances."

Warning that we must match our opponents in aggressiveness and daring, Mr. Trembly urged the industry to "counter attack the counter-cooking sector" and balance their attention-arresting "electronics" with our slogan "pyronics." He then proceeded to describe the comprehensive program of the A.G.A. Food Service Equipment Committee, designed to meet this competitive challenge.

Gas Conversion Problems

The vital problems of industrial and commercial gas reconversion were attacked by two of the gas industry's most experienced representatives—Karl Emmerling, The East Ohio Gas Co., Cleveland, and J. P. Leinroth, Public Service Electric & Gas Co., Newark, N. J.

Pointing out that the average industrial gas customer will have to rehabilitate old idle equipment, devise new ways of using war production equipment, or purchase new equipment, Mr. Emmerling offered a forthright four-pronged program. He urged (1) building up our industrial departments *now,* (2) fitting idle fuel-burning equipment now in use into reconversion plans, (3) redesigning and reconditioning idle equipment for use on new products or for better use in making prewar products, and (4) assisting postwar planning by selecting new gas-burning equipment, either for old manufacturing processes that are to be revived, or for the new ones that will replace them.

As an intelligent approach to the reconversion problem, Mr. Emmerling advocated a complete survey to find out what the customers are planning, and where gas will fit into these plans.

Mr. Leinroth called attention to the tremendous impetus industrial gas has received as a result of the war and strongly urged the industry to keep its customers informed of all advances made in gas burning equipment. Posing the question of whether your customer knows the latest in gas carburizing, atmospheres, flame hardening, etc., he said that his company is distributing literature dealing with new gas developments with the idea of influencing the postwar customers.

As one method of helping customers, Mr. Leinroth suggested setting up an organization to assist them in buying or selling pieces of gas equipment during the conversion period. This could be done by surveying plants to determine what equipment their customers will dispose of and what they need for postwar use.

Noting that since the war equipment manufacturers and industrial gas men have drifted apart, he said this condition should be corrected as soon as possible. He also called for an allocation of manpower based upon market studies and more attention to sales policies and methods.

The Friday morning session began with a valuable presentation of new information on large and small gas immersion tubes by William R. Teller, chief research engineer, A. G. A. Laboratories, Cleveland. Mr. Teller's paper, covering two years research at the Laboratories, is reproduced in this issue.

At this point in the program, Major Alexander Forward, managing director, American Gas Association, greeted the conference and congratulated the industrial and commercial gas men on their splendid wartime contributions.

Postwar Planning

Hall M. Henry, vice-president, New England Gas & Electric System, Cambridge, and chairman of a Postwar Planning Subcommittee, gave a comprehensive picture of the gas industry's postwar program and reported considerable progress in A. G. A. committee work. His remarks are included in this issue.

Spectacular innovations in furnace design and gas heat applications were described by Carroll Cone, Surface Combustion, in a notable talk on "New Horizons for Industrial Gas." Mr. Cone's paper appeared in full in the April MONTHLY.

A highly informative discussion of the administration of such wartime regulations as Order L 182 concluded the Friday morning session. Principal government speakers, who answered questions from the floor during this period, were Harry J. Holbrook, chief, appliance branch, Plumbing and Heating Division, War Production Board, and C. L. Brockschmidt and F. M. Kimball, both of the War Production Board.

Headliner at the Friday luncheon session was Dr. C. K. Mees, vice-president in charge of research, Eastman Kodak Co., Rochester, who gave a provocative and entertaining account of the development of scientific research.

Tribute both to industry and Army Ordnance was paid at the luncheon session by Brigadier General Safford, chief of the production service branch, Office of Chief of Ordnance, whose address was a highlight of the conference. "The industrial facilities of the country," he said, "were initially inadequate to provide the variety of war equipment in the short time it had to be produced. The result was the biggest industrial expansion this country has ever seen. Numerous new plants were constructed.

"Some of these plants, thanks to improved production, recently have been placed in standby condition, or converted to other uses. Changes in troop requirements since original plans were made also have influenced the industrial picture." Army Ordnance, General Safford said, produced 1,700 items, output of which has to be kept flexible because of sudden shifts in methods and fortunes of war.

In reviewing the annual fuel requirements of the Rochester Ordnance District, Col. Frank J. Atwood, district chief, who introduced General Safford, said the total amount of coal, coke and oil would require a freight train 2,049 miles long, comprised of 274,571 cars, long enough to reach from New York City to Denver, Colorado. Col. Atwood praised the gas industry for its excellent job of meeting production schedules.

"The Value of Industrial and Commercial Gas Load to Utilities" was the subject of an authoritative paper by Edward N. Strait, Public Utility Engineering and Service Corp., Chicago and chairman, A. G. A. Rate Committee, which, in Mr. Strait's absence, was presented by Harry A. Sutton, Public Service Electric & Gas Co., Newark. In his paper, Mr. Strait traced the development of industrial and commercial gas sales and the reasons for the present all-time peaks.

While conceding the tremendous effect of the war on industrial and commercial gas sales, Mr. Strait declared that "had normal conditions continued in effect during the past 10 years, the unimpeded growth of civilian requirements of gas for these purposes might well have necessitated the present volume." From this, he concluded that "postwar requirements for civilian purposes may, with adequate sales-attention, equal or approximate the gas loads now supplied for war purposes."

Mr. Strait said that "much of the present industrial gas load has been developed under rate structures that give effect to value of service." As his final conclusion, he expressed the belief that "the development of commercial and industrial loads in many instances either already constitutes or presents an opportunity for a great sustaining force in an industry in which the domestic business has, in recent years, shown either a declining or barely more than static condition."

Presenting the results of a survey of industrial and commercial gas equipment installed in colleges, Robert C. LeMay, The Connecticut Light & Power Co., Waterbury, strongly urged a campaign to replace antiquated equipment which is creating a poor impression among engineering students. His report, which has significant postwar aspects, was published in the April MONTHLY.

Reflecting current interest of the gas industry in the gas turbine, the conference closed with a discussion of progress in this field by John Avery, of the Allis-Chalmers Co., Milwaukee. With the aid of numerous slides, Mr. Avery traced the evolution of the gas turbine from its 150-year-old patents until present-day application.

At the end of the business program on both days, "friendship hours" were held from 5:00 to 7:00 P.M. for the purpose of increasing the acquaintance of the delegates and promoting interchange of information. These popular events were sponsored by the Industrial & Hotel & Restaurant Divisions of Association of Gas Appliance and Equipment Manufacturers with E. J. Shermire acting as chief greeter, assisted by Edward W. Mears.

American Gas Association Industrial and Commercial Gas Advertising for May

The National Advertising Committee of the Industrial and Commercial Gas Section, J. P. Leinroth, chairman, and F. B. Jones, vice-chairman, announces that full page advertisements will appear in the trade and business magazines listed below during the month of May. These advertisements are prepared in cooperation with the Committee on National Advertising as a part of the industry's national advertising campaign.

MAGAZINE	THEME
	General Manufacturing
BUSINESS WEEK (May 20—⅔ page)	Back of the Nation's production miracle . . . *GAS research* yesterday—today—tomorrow!
	Metals Industry
INDUSTRIAL HEATING METAL PROGRESS STEEL (May 15)	Maybe *GAS* "furnaceless heating" can fit into *your* postwar production.
	Glass Field
GLASS INDUSTRY	Getting set for postwar operation? Check into how *GAS* equipment, drafted for war, is being improved for peace!
	Restaurant Field
RESTAURANT MANAGEMENT HOTEL MANAGEMENT	Low-temperature roasting saves meat for the Army too! Recent tests prove value of method long favored for civilian *GAS* cooking.
	Hospital Field
MODERN HOSPITAL	Now—cooking is more of a science than ever! *GAS* cooking is proving itself brilliantly despite adverse wartime conditions.

Technical SECTION

CHARLES F TURNER, *Chairman*
L E KNOWLTON, *Vice-Chairman*
A GORDON KING, *Secretary*

Coatings Useful for Distribution Systems

By KIRK H. LOGAN

National Bureau of Standards
Washington, D. C.

INCREASING shortages in manpower and materials and increasing operating costs make it essential that distribution men conserve pipe in the maintenance and extension of the system under their control. One means of economizing is the intelligent use of pipe line protection. The purpose of this paper is to consider what has been established regarding protective coatings and to call special attention to data applicable to distribution systems.

Two facts regarding protective coatings have impressed the writer. (1) The changes in pipe protection practice have been largely improvements in coating materials and practices rather than the introduction of things radically different and (2) many pipeline operators are not availing themselves of the facts at their disposal.

It seems worth while, therefore, first to briefly summarize the data which the activities of the American Gas Association and the American Petroleum Institute have collected through their research associates insofar as it is applicable to distribution systems and then to consider the additional facts which have developed since the work of these research associates, with respect to pipe coatings, was discontinued.

A. G. A.-A. P. I. Studies

In 1928 both the American Gas Association and the American Petroleum Institute started studies of pipe coatings. Ewing, who directed the A. G. A. studies, buried four specimens of each of 42 coatings applied to 2-foot sections of 2½ inch pipe in 14 soils, and removed one specimen of each coating from each site at the end of approximately 0.75, 2.4, and 5.5 years. The fourth set of specimens has not been examined. Ewing[1] made four reports on this project. Scott, who conducted the A.P.I. coating research, buried three specimens of each of 46 coatings, applied to 2-foot sections of 3-inch OD pipe at each of 16 test sites, two of which were abandoned before the completion of the tests. He also applied 16 coatings to 60-foot sections of pipe lines, but no one line coating was tested at more than 12 sites. Since the sites differed in destructiveness to coatings, all of the data on the line coatings are not comparable. The lighter coatings were tested at the less destructive sites. Scott[2] made four reports on this work but the final inspection and report[3] was made by the writer with the assistance of Scott and several pipeline engineers and coating technologists after the coatings had been in the ground about ten years. Reports on the final inspections were published in 1940 and 1941.

Results of Coating Tests

The men concerned with the planning of the tests and inspections worked together and their conclusions, though differing in details, are generally similar. Ewing pointed out that in the A.P.I. tests, after exposures of about 4 years, the line coatings applied by hand in the field where in every case less effective than similar coatings applied to small diameter pipe at a central plant. He advised against hand field-applications. He stated that any organic reinforcement was a weakness, emphasized the destructive effect of soil stress, and advocated the use of a shield over the coating to reduce the effect of soil stress. Both he and Scott noted that after 5½ years or less no coating under observation prevented all corrosion at all test points. The writer of the final report had the advantages of examining coatings approximately twice as old as those of Ewing or Scott, and line coatings of twice the area examined on previous occasions. He paid attention chiefly to the condition of the pipe beneath the coating on the theory that this was the best criterion for the effectiveness of the coating.

A review of the several reports on the A. G. A. and A.P.I. tests indicated that there was a continued deterioration of the coatings as indicated by increased numbers of holes in the coating, increased electrical conductance, and increases in the number and depths of pits beneath the coatings. The conclusion must be reached that although many of the coatings greatly reduced the amount of corrosion during the ten-year test, none of them would prevent corrosion indefinitely; indeed no coating prevented all corrosion at all test sites for ten years.

It follows from this observation that in computing the savings resulting from the application of a coating the engineer should not assume that the coating would eliminate repairs and maintenance indefinitely as Ewing[4] did for convenience in discussing the economics of coatings.

Although the period during which the poorer coatings will prevent leaks may be quite limited, the time during which the coating will reduce the amount of current required for cathodic protection is much longer.

The effectiveness of the A.P.I. coatings

Presented at 21st Annual Distribution Conference, Hotel Statler, Cleveland, Ohio, April 18-19, 1944.

[1] S. Ewing. Proc., A. G. A. 1309(1930); 774 (1931); 741(1933); 627(1936).

[2] G. N. Scott, A.P.I. Coating tests—Progress reports I, II, III, IV. Proc. A.P.I. XI(4), 107(1930); XII(4), 134(1931); XIII(4), 114(1932); XV(4), 18(1934).

[3] K. H. Logan, Proc. A.P.I. XXI(4), 32 (1940); XXII(4), 34(1941).

[4] S. P. Ewing, Corrosion Surveys for Pipe Lines. Proc. A. G. A. 846(1934).

Distribution Conference

The twenty-first annual Distribution Conference of the Technical Section was held April 18 and 19 in Cleveland, Ohio. In addition to the attractions of a well-balanced topical program which reflected great credit on Chairman A. C. Cherry and his associates, The East Ohio Gas Company and the Association's Laboratories entertained several hundred visiting delegates on conducted tours of their plants.

Success of the conference was reflected in the registration which numbered 315 delegates and the fact that the four luncheon conferences strained the hotel kitchen facilities by attracting 421 persons.

Conference dates fell on the MONTHLY copy deadline for this issue, making it necessary to defer an illustrated story of the meeting until the June issue.

Herewith is presented one of the important papers presented at the Conference.

after ten years on pipe lines was determined largely by dividing the pipeline into one-foot lengths and recording the condition of each foot as unaffected, rusted, metal attack (pits less than 10 miles deep), or pitted, together with the depth of the deepest pit. All of these criteria are measures of the corrosivity of the soil rather than of the condition of the coating but they indicate the relative effectiveness of the coatings in the same soil if one may assume that the seriousness of the corrosion is a function of the duration of the exposure, i.e., an inverse function of the time the coating prevented corrosion.

In general, the effectiveness of the coatings as indicated by the percentages of coated one-foot lengths which developed pits or by the maximum pit depths was roughly proportional to the thickness of the coatings regardless of the kind of bitumen or the structure of the coating.

The percentage of pipe areas of the pipe which were pitted is perhaps the best criterion for the effectiveness since some greases and asphalts transmit enough moisture to permit slight rust to form but seem to retard the progress of more serious corrosion, while the maximum pit depth is to some extent an accident which may be the result of some very local condition.

The pipes under the paints and cutbacks showed the greatest percentages of pitted areas. The enamels came next and the shielded and reinforced coatings were as groups about equally good though the reinforced coatings were with one exception thicker.

Reinforced Coatings

In the group of reinforced coatings in the A.P.I. line tests there were one grease and three asphalt base coatings reinforced by cotton cloth, a coal-tar and an asphalt base coating reinforced by rag felt, and a coal-tar and an asphalt-enamel reinforced by asbestos felt. The data on these coatings provide bases for studying the effects of the differences on base materials and on reinforcements but reliable conclusions are difficult to draw because all of the coatings differ in several ways. For example, the osnaburg fabric is thinner than either of the felt reinforcements and the asbestos felt is thinner than the rag base felt. Some coatings were made up of a single layer of fabric while others had two layers with bitumen between them. These multiple variables were unavoidable in a test based on coatings as furnished to and used by pipeline operators. A hand-applied, asbestos felt shielded, coal-tar enamel containing some asphalt appeared to be superior to a shop-machine-applied coating consisting of two coats of coal-tar-asphalt enamel, although the latter coating was nearly three times as thick. This observation fails to support Ewing's conclusion as to the superiority of coatings applied by machine at a coating plant but one must remember that several variables in addition to method of application were involved.

A comparison of reinforcing materials is

(Continued on next page)

Joint Production and Chemical Committee Conference

HOTEL PENNSYLVANIA, NEW YORK, N. Y.

Tuesday, June 6

9:45 A.M.

V. J. Altieri

OPENING REMARKS, V. J. Altieri, Chairman, Chemical Committee.

GREETINGS, Alexander Forward, Managing Director, American Gas Association

ADDRESS, E. R. Acker, President, American Gas Association

FUTURE SUPPLIES AND QUALITIES OF COAL, Ralph Sherman, Battelle Memorial Institute, Columbus, Ohio

PROGRESS IN COAL RESEARCH, J. S. Haug, Chairman, Subcommittee on Survey of Gas, Coke and By-Product Making Properties of American Coals, Philadelphia, Pa.

GAS CONDITIONING, H. D. Lehman, Chairman, Gas Conditioning Committee, Philadelphia, Pa.

SAFE MANUFACTURED GAS OPERATION, Charles Koons, Chairman, Subcommittee on Safe Practices in Manufactured Gas Plants (Subcommittee of General Committee on Accident Prevention) Kearny, N. J.

2:00 P.M.

OPENING REMARKS, F. J. Pfluke, Chairman, Gas Production Committee

ADDRESS, George S. Hawley, Chairman, Manufactured Gas Department—American Gas Association, Bridgeport, Conn.

POSTWAR PLANNING, J. V. Postles, Chairman, Technical Committee on Postwar Planning Cooperation, Philadelphia, Pa.

MOBILIZING FOR POSTWAR PROGRAM, A. M. Beebee, Chairman, Postwar Planning Committee, Rochester, N. Y.

USE OF OXYGEN IN GAS PRODUCTION, Dr. S. P. Burke, Chairman, Columbia University, New York, N. Y.

HIGH B.T.U. GAS PRODUCTION, L. G. Kreuz, Chairman, Subcommittee on High B.t.u. Gas, Detroit, Mich.

INCREASING THE CAPACITY OF PRESENT WATER GAS EQUIPMENT, George R. Steere, Swampscott, Mass.

AUTOMATIC DOMESTIC COKE STOKERS, C. E. Shaffer, Koppers Co., Pittsburgh, Pa.

Wednesday, June 7

9:30 A.M.

F. J. Pfluke

MIXED GAS RESEARCH, H. O. Loebell, Chairman, Mixed Gas Research Committee of the Natural Gas Department and Technical Section, New York, N. Y.

SUBSTITUTE GAS FOR COKE OVEN GAS, O. W. Barenscher, Wisconsin Public Service Corp., Sheboygan, Wis.

BUTADIENE MANUFACTURE, Guy Corfield, Southern California Gas Co., Los Angeles, Cal.

COMBUSTIBLE GAS DETECTORS, W. R. Fraser, Michigan Consolidated Gas Co., Detroit, Mich.

STUDIES ON THE IDENTITY AND CONTROL OF STILBACEOUS MOLD IN GAS PURIFYING SPONGE, Dr. E. F. Guba, Massachusetts State College, Amherst, Mass.

GAS ENRICHING OIL FROM THE VIEWPOINT OF THE GAS INDUSTRY, P. T. Dashiell, The Philadelphia Gas Works Co., Philadelphia, Pa.

12:30 P.M.

ROUND TABLE LUNCHEON CONFERENCES

Luncheon No. 1

CARBONIZATION AND COKE, Dr. W. C. Rueckel, Chairman, Koppers Co., Pittsburgh, Pa.

Luncheon No. 2

CHEMISTRY IN THE GAS INDUSTRY, Louis Shnidman, Chairman, Rochester Gas & Electric Corp., Rochester, N. Y.

Luncheon No. 3

HIGH B.T.U. GAS, L. G. Kreuz, Chairman, Michigan Consolidated Gas Co., Detroit, Mich.

Luncheon No. 4

WATER GAS OPERATION, H. B. Young, Chairman, Connecticut Coke Co., New Haven, Conn.

of interest. An osnaburg-reinforced asphalt coating was definitely superior to a saturated rag-felt reinforced coating of the same thickness and slightly more effective than a slightly thinner asbestos-felt reinforced asphalt enamel.

With respect to the percentage of pitted pipe areas a machine-applied asbestos-felt reinforced coal-tar-asphalt enamel was almost equal to a hand-applied rag-felt coal-tar enamel similar in construction but twice as thick. A ½-inch thick machine-applied asphalt-mastic coating was far superior to any of the other coatings by any of the criteria used by Ewing, Scott or Putnam. This coating was applied as a spiral wrap and occasionally water entered at the seams. It is now extruded around the pipe and is seamless except where sections of pipe are joined. The applications of two different coal-tar-asphalt enamels resulted in smaller percentages of pitted pipe than a somewhat thicker straight coal-tar enamel manufactured by one of the most prominent makers of this type of coating. These data seem to indicate that the prohibition of any asphalt in coal-tar enamels which frequently occurs in coating specifications is unjustified.

In all of the comparisons cited the results can be explained in more than one way and in several cases the apparent relative merits of the material might have appeared different if other bases for comparison had been used.

In addition to conducting tests of coatings, Scott made extensive inspections of coatings applied to working lines and issued a tentative code of good pipeline coating practice. He emphasized the fact that many coating failures were caused by faulty application or careless handling of the coated pipe.

Scott and Ewing conducted tests of rot-resisting properties and found that all organic fabrics exposed to an organic soil rotted within a year.

Recent Improvements in Coatings and Coating Practices

Many feel that because of the work of these men and others, ineffective coatings have been eliminated, and that because of the improvement in coating materials and practices, the data on the coatings in the A. G. A. and A.P.I. tests are obsolete. The chief additions to the materials field are coal-tar enamels less sensitive to temperature changes, detailed specifications for coal-tar enamel coatings, and the introduction of a transparent cellulose membrane backed by a fabric as a reinforcement for a grease coating. Some bacteriologists claim that such membranes are attacked by certain bacteria.

The new enamel referred to requires a different technique for its application. The effective use of the specifications for the new coal-tar enamels requires close control of all apparatus and testing procedures and some laboratories have had difficulty with their tests. While it seems probable that the improvements mentioned above together with the use of electrical inspection and greater care in the application and handling of coatings and coated pipe have resulted in better protection neither experience nor tests are available which show definitely the extent of the improvement.

Two reports of tests of recent asbestos-felt reinforced coal-tar enamel coatings have come to the writer. One report on a coating with which extraordinary care was taken to secure a coating virtually free from pinholes showed that the electrical resistance to ground of all of the 7 sections into which the coated pipe was divided by insulating joints decreased to from 30 to 1 percent of the original values within 4 years. The sections differed by a ratio of 30 to 1 in both their original and final resistances. The section which originally had the highest resistance had one of the lowest resistances four years later. The greatest changes in resistance occurred within the first year. Three out of five coatings reported on by another engineer showed similar variations in the resistances of different sections of the lines and little change in resistance after the first year. Part of the apparent stability of the resistances of the old coatings may be due to the fact that the measurements include the resistance of the soil and perhaps other resistances. When the resistance of the coating is high these are negligible but when the coating resistance becomes low any change in it is obscured by the other resistances included in the measurement.

The satisfactory application of hot coatings requires a clean, dry pipe. Occasionally conditions arise under which the elimination of moisture is very difficult. The use of a reinforced grease coating has been suggested for such conditions and one manufacturer recommends a transparent cellulose membrane cemented to some thicker fabric as the reinforcement. Few data on long-time exposures of such coatings are available. An extensive user of cement coatings has reported satisfactory results except for an apparent acceleration of corrosion just beyond the coated section. It seems probable that the alkali in the cement makes the coated pipe cathodic with respect to the adjacent uncoated pipe. Insulating joints or coating the entire line might eliminate this trouble.

There have been big improvements in machines for cleaning pipe and applying coatings, and these machines produce better appearing coatings. Facilities for testing coatings are better. High-voltage apparatus for locating pinholes was introduced soon after the A. G. A. and A.P.I. tests were started. The early apparatus lacked voltage control and it was difficult to apply the test to all of the coatings. Pinholes were missed. Sometimes too high voltage was applied at one point too long and the coating was injured. Recently Stearns[5] has developed a rather elaborate piece of apparatus which operates at about 8000 volts and cuts off the current as soon as a pinhole has been located. The voltage is applied by a spiral coil of wire which surrounds the pipe, and both visual and audible signals are given when a spark passes through a hole in the coating. Trials have

Dog-eared for Technical Men

The following list of references to technical literature deemed of interest and value to members of the Technical Section, has been prepared by Luis Hilt, librarian of the American Gas Association, as the beginning of what is planned to be a continuing feature. Subsequent lists of technical articles and reports will be the result of suggestions also supplied by chairmen of the Technical Section Committees. Only references readily accessible in the Association's Library will be listed. Should readers desire, photostatic copies of articles will be made available at 25¢ per page.

Measurement of Gas Flow: Experiments with a Lenticular Orifice Meter, Conducted by the Research Department of the National Gas Association of Australia—National Gas Bulletin (Melbourne), July-August 1943: 11-13; Same. Gas Times, December 1943: 34-6.

Liquid Fuels and Organic Chemicals from Coal and Home Refined Petroleum—Harold Moore—Gas World, February 12, 1944: 166-172 & February 19, 1944: 191-9; Same condensed. Gas Journal, February 2, 1944: 149-150, 155 & February 9, 1944: 180, 183 (Paper presented before Institute of Fuel, England, February 1, 1944).

Gasification of Low Volatile Fuels—H. R. Forman—Gas World, March 11, 1944: 262-270 (Paper presented before Institute of Fuel, England, January 14, 1944).

Corrosion of Buried Metals and Cathodic Protection—M. C. Miller Petroleum Engineer, March 1944: 208, 210, 212 (To be continued).

Concepts and Methods of Cathodic Protection: Measurements of Cathodic Polarization and Problems of Interference on Underground Structures—J. M. Pearson—Petroleum Engineer, March 1944: 216, 218, 220 (To be continued).

Literature of the Gas Industry, The—T. A. Tomlinson—Gas Journal, March 1, 1944: 272-3.

Homer Laughlin Gas Producer Makes 21¢ Gas—Ceramic Industry, April 1944: 76, 78, 80, 82 (To be continued).

shown that this apparatus discloses many holes in coatings not located by older apparatus. It is doubtful whether any of the high-voltage apparatus will locate thin spots in coatings though Stearns[5] claims his apparatus will locate pinholes in reinforced coatings. Pearson[6] has gone a step further and invented a machine which will locate holidays, pinholes and low-resistance areas in buried coated lines from the surface of the ground, making it possible to determine the condition of a coating without excavations. The apparatus works satisfactorily only when the line has been buried long enough for moisture to enter the holes, or be absorbed by the coating.

It appears from the above statements that the possibilities of securing better protection for pipe lines have greatly improved. The extent of the improvement in coatings as they are actually applied has been shown by rather few data.

Several reports on recently applied coatings indicate that the pipe line with a continuous coating is still rare, and pipeline operators seem to be reluctant to determine just how good their coatings are. No doubt this is partly because of the press of more

(Continued on page 230)

[5] D. E. Stearns, Electronic holiday detector. Fifth NBS Underground corrosion conference. (1943)

[6] J. M. Pearson, Electrical examination of coatings on buried pipe. Petroleum Eng 12 No. 10 (mid-year number), p. 82(1941).

Water Gas Experts Confer

MEMBERS of the Gas Production Committee's Subcommittee on Water Gas of the Technical Section, with a number of specially qualified guests, held a meeting at Association Headquarters on Wednesday, March 29, for the purpose of discussing with George R. Steere of Swampscott, Mass., his presentation on "Increasing the Capacity of Present Water Gas Equipment," scheduled for the coming Joint Production and Chemical Committee Conference in New York, June 6 and 7.

In the picture above, reading from left to right, are: R. Van Vliet, Vice-Chairman, Gas Production Committee, New York & Richmond Gas Co., Stapleton, S. I., N. Y.; R. E. Titus, Kings County Lighting Co., Brooklyn, N. Y.; J. D. Alden, Asbury Park, N. J.; H. B. Young, Connecticut Coke Co., New Haven, Conn.; A. S. Hall, Springfield Gas Light Co., Springfield, Mass.; R. J. Horn, Central Hudson Gas & Electric Co., Poughkeepsie, N. Y.; R. S. Emanuel, Public Service Electric & Gas Co., Harrison, N. J.; W. E. Lebo, Public Service Electric & Gas Co., Harrison, N. J.; Seated: left to right: J. Hawley Taussig, Vice-Chairman of the Water Gas Subcommittee, United Engineers and Constructors, Inc., Philadelphia, Pa.; F. W. Hartzel, Chairman, Water Gas Subcommittee, The Philadelphia Gas Works Co., Philadelphia, Pa.; and George R. Steere, Swampscott, Mass.

The following had to leave New York before the Secretary of the Section, who took the photographs, photographed the group: L. E. Dequine, Jersey Central Power & Light Corp., Long Branch, N. J.; C. A. Schlegel, United Engineers & Constructors, Inc., Philadelphia, Pa.; Marshall Hyde, The Detroit Edison Co., Port Huron, Mich.; A. C. Sedlachek, Philadelphia Coke Co., Philadelphia, Pa.; R. H. Arndt, Consolidated Gas Electric Light & Power Co. of Baltimore, Baltimore, Md.; P. T. Dashiell, The Philadelphia Gas Works Co., Philadelphia, Pa.

Technical Section Committee Meeting

THE Technical Section's Gas Production Committee's Subcommittee on the Use of Oxygen for the Production of Manufactured Gas met at Association Headquarters Friday, March 31, to consider the production of oxygen in the manufacture of gas. A report will be presented by the chairman, Dr. S. P. Burke of Columbia University, New York, N. Y., at the Joint Production and Chemical Committee Conference of the Technical Section, to be held in New York June 6 and 7 next.

In the photograph, left to right, standing are: W. O. Keeling, Koppers Co., Pittsburgh, Pa.; Prof. J. J. Morgan, Columbia University, New York, N. Y.; W. G. Fogg, Air Reduction Co., New York, N. Y.; L. L. Newman, U. S. Bureau of Mines, Washington, D. C.; Seated, left to right: Gladys Hanshaw, A. G. A. Headquarters; Dr. S. P. Burke, Chairman, Columbia University, New York, N. Y. and Prof. A. H. White, University of Michigan, Ann Arbor, Michigan.

Study Utilization of Coal "Fines"

A WIDER utilization of anthracite "fines" to reduce an annual surplus of a million tons of this kind of fuel and to relieve shortages in other fuels is being investigated by Bureau of Mines engineers.

The investigations and experiments, being made at the request of the Office of Solid Fuels Administration for War, will explore the possibilities of using more anthracite fines—No. 3 size and smaller—to mix with bituminous coal in briquettes, to replace low-volatile coal in by-product coke ovens, and in gas producers which normally use larger sizes of anthracite.

PIPELINE COATINGS

(Continued from page 229)

urgent work and partly because there is little that can be done about a defective coating which is in the ground except perhaps to apply cathodic protection.

A few tests in Texas cities indicate that the restricted aeration of soils beneath pavements is favorable for the development of the anaerobic bacteria which are sometimes destructive to pipe. The action of these bacteria may partly explain the accelerated corrosion often observed at points where pipe lines cross highways. Other tests indicate that the hydrochloric acid test for sulfate reducing bacteria should be used with caution in cases where the soil is saturated with gas leakage. The gas may add sulfides to the soil.

Application of Coating Data to Distribution Systems

We may now summarize the data with respect to gas distribution systems.

There are several differences between cross-country pipelines and distribution systems in towns and cities. Some of these are favorable to the latter. The short hauls usually involved and the favorable conditions for the proper application of coatings at a central plant seem to make a coating applied by machine at a central plant advisable under many conditions. Two general types of coatings seem worthy of consideration, (1) the asphalt-mastic, (2) a reinforced or shielded coal-tar enamel preferably of the so-called plasticised or water works enamel type.

While the mastic coating has been used chiefly on cross-country lines there appears to be no reason why lines so coated cannot be tapped if the pipe wall is sufficiently thick. If the pipe wall is so thin that a saddle must be used to attach the service it should be possible to remove the coating for this purpose though this is somewhat difficult and some injury to the coating may result. It is quite possible to satisfactorily patch the coating at joints and presumably at other places. The plasticised enamel has been used chiefly on water lines but there seems to be no reason why it would not serve as well on gas lines. Three or four prominent coating manufacturers produce this type of enamel and Bureau of Standards tests indicate that any of the coatings which meet the A.W.W.A. specifications will serve equally well if equally applied to a pipe line.

Because reinforcements are seldom entirely water-proof and may serve as a wick to carry moisture into a coating, the writer prefers a shield to a reinforcement if the thickness of the bitumen is maintained. However, reinforcements are in more general use probably because it is easier to build up a thick coating by means of the reinforcement and because the outer layer of bitumen tends to keep moisture out of the fabric. Since the shield will be exposed to the action of bacteria, it should be inorganic. The A.P.I. tests indicate that the shield should be permanent and rather stiff. The coating should be tested for pinholes and abrasions at the last practical moment before it is placed in the trench, preferably by some machine such as the automatic pinhole detector.

Notwithstanding the care which is taken to prevent pinholes and injuries the coating will not be free from them. Data are not available to justify a definite statement as to what should be done about this. Those who like to figure may consider possible solutions to the following corrosion prevention problems:

(1) Since in most soils there is a marked decrease in the rate of corrosion of iron and steel as the period of exposure increases, it might be worth while to determine whether the cost of additional metal sufficient to make the pipe wall thickness greater than the probable depth of the deepest pit which might develop within the service life of the pipe is less than the cost of a coating which would prevent corrosion of a light-weight pipe during the same period.

(2) The comparative cost and effectiveness of coatings and cathodic protection by means of zinc as it is being tried in Houston.

(3) The reduction in maintenance costs by the location of weak spots in coatings by means of the Pearson coating tester and their subsequent repair. So far as the writer knows the apparatus has not been applied to coatings under pavements. These problems might make good projects for a corrosion committee.

Predict Tar and Light Oil Yields

A MORE accurate method of predicting the primary tar and light oil yields of various types and ranks of coal has been developed by Bureau of Mines chemists as the result of their tests on lignitic, subbituminous, and bituminous fuels, Dr. R. R. Sayers, Bureau Director, announced today.

The chemists, W. H. Ode and W. A. Selvig, both attached to the Bureau's Central Experiment Station at Pittsburgh, Pa., said that the amount of tar and light oil can be correlated with the hydrogen content and with the volatile matter reduced by an amount equal to 1.3 times the oxygen content. Volatile matter alone is not a good index of tar and light-oil yields when coals of all ranks are considered, the chemists reported. The report describes their experiments and includes tables showing the yields from many samples of coal from various parts of the United States. Varieties or types studied include common banded, splint, cannel, cannel-boghead, and boghead-cannel coals.

A copy of the publication, Report of Investigations 3748, "Low-Temperature Distillation Yields of Primary Tar and Light Oil from Coals of Various Ranks and Types," may be obtained by writing the Bureau of Mines, Department of the Interior, Washington 25, D. C.

Coal Hydrogenation Study at Purdue

REPORT No. 1 on "The Hydrogenation of Coal at High Temperatures," by J. L. Bray, head, School of Chemical and Metallurgical Engineering, Purdue University, and R. E. Howard, instructor in chemical engineering and assistant in the Engineering Experiment Station, has just been published by the University. This report covers investigations sponsored by the Indiana Gas Association, and is the first of a series dealing with this subject, with special reference to Indiana coal.

The hydrogenation of Indiana fourth-seam coal was investigated without the use of vehicles or catalysts in the temperature range from 750° F. (400° C.) to 1060° F. (570° C.) and at pressures up to 4500 pounds per square inch. The high-pressure reaction bomb was constructed of a pearlite manganese steel and was operated as a constant-volume batch system.

Hydrogenation was effected both with approximately equal weights of coal and hydrogen in the reaction space and with a large excess of carbonaceous material. Data are given for the variation of gas composition with time for various temperatures, and the equilibrium values of gas composition are determined.

Motor Vehicle Conference

Hotel Bellevue-Stratford
Philadelphia, Pa.

TUESDAY, JUNE 27
10:00 A.M.

SAFETY THROUGH PROPER DRIVING PROCEDURE, Linn Edsall, Philadelphia Electric Co., Philadelphia, Pa.

DISCUSSION ON SAFETY, ACCIDENT PREVENTION, PENALTIES, etc.

General Luncheon

At this general luncheon, a prominent industry executive will address the delegates.

2:00 P.M.

DISCUSSION OF BODY AND CHASSIS STANDARDIZATION

POSTWAR PROBLEMS, Jean Y. Ray, Virginia Electric & Power Co., Richmond, Va.

OPERATING PROBLEMS, S. G. Page, Equitable Auto Co., Pittsburgh, Pa.

Details of the program for the Conference on the Operation of Public Utility Motor Vehicles have not been completely consummated. It is planned to have a talk on a timely subject of interest to the membership by a well-informed executive. Every effort will be made to offer information of value to those attending the Conference.

POSTWAR OBJECTIVES

(Continued from page 209)

market potential for gas. In too many instances where the operating cost for gas is more than competitive fuels the companies have abandoned the direct sales of appliances and depended on the dealers with a total disregard of the fact that, except for the sale of ranges and perhaps refrigeration, the dealer cannot possibly afford to actively push the sale of gas appliances, for the very simple reason he can make more money selling competitive appliances.

A study of the sales results of these companies over the past six years show their New Business costs have been high and their gains in M.C.F. and revenues low. Our industry must stop ducking its responsibilities and see that gas service is properly and often presented to our customers so they may have an intelligent basis for a fuel selection. This means the employment of *an adequate and properly trained sales force.* This force can be company or dealer or a combination of the two but in establishing the size of the force the company must recognize that sales are the result of salesmen and that one salesman whether he be company or dealer can only produce so much business.

If that salesman is to sell appliances other than gas then a big allowance must be provided in setting up the final sales force. Each company can determine from its own sales records how many appliance units it can expect from a salesman per year and knowing what volume of sales it wants and can afford to pay for in any one year (after all it costs money to obtain an increase in gross revenues) it can readily determine the size of its Sales army. (See Economics of Sales Report—Market and Economic Research Committee—1942-19-43.) The important fact to keep in mind is that this law of sales cannot be ignored if a company wishes to achieve its objectives.

Commercial and Industrial Sales Force Inadequate

As I see the commercial and industrial gas situation, particularly the commercial field, most if not all of the gas companies have been undermanned. The industry in postwar will need to enlarge its commercial and industrial personnel if it desires to keep loads and expand in these fields. A study of the sales performance of some 40% of the meters in the manufactured gas industry shows a wide disparity in the volume of M.C.F. Sales and revenues per total customer for both commercial and industrial sales.*

We would expect considerable variation in the sales and revenues in the industrial field because the load potentials vary considerably as between companies. In the commercial field there is not the wide variation in market opportunity but yet some companies have obtained 13.5 M.C.F. per year per total customer vs. others of only 2 M.C.F. per year.

While detailed information is lacking on commercial salesman power over a period of years for all of the companies studied, it is evident from such data as are available that the sales coverage played an important part, if not the essential part, in bringing about these larger sales per total customer. In some companies there are 500 commercial customers per salesman—in others 2,000 or more. Each company would do well to survey its salesman power in both the commercial and industrial field to make certain it has an adequate and properly trained force to fully develop its market potentials. Your committee might also give consideration to an accounting procedure that would enable a proper comparison of the commercial sales development as between companies. A statement of what constitutes a commercial customer would be helpful in this direction.

Coordinated Kitchen Program and Sales Promotion Director

The Postwar Planning Committee through its activities on developing a coordinated kitchen program has taken an important step in overcoming some of the deficiency in our sales promotion and the proposed employment of a full-time sales promotion man at A. G. A. would also prove helpful. These two activities, plus national advertising, will do much to prepare the public mind for the further acceptance of gas. However, these in themselves will not produce the volume of sales we will need in postwar. We must have an adequate sales force to fully capitalize on these good works; it will still require salesmen to get the orders.

Industrial Gas Personnel Function of Market Opportunities

It is impossible to generalize as to salesman power to cover the industrial field. Each company must decide on its salesman power needs based on its local market potentials. Since the potential industrial gas market is not the same in all companies this also makes it impossible to compare the industrial gas sales development of one company with another, such as is possible with domestic, heating and commercial sales. Hence in the industrial field each company must rely on a study of the industrial gas market potentials for an appraisal of its own accomplishments and salesman power needs.

Thus each company should have a complete industrial gas survey and these surveys should be kept up to date by a yearly analysis of new plants and uses and the market potentials revised to reflect any new developments in the applications of gas. My observation has been that too many companies fail in this important matter of a "proper" industrial gas survey. By a "proper" survey is not meant a mere census of the quantities of fuels used by classes and by plants or a census by type of operation in each plant. The "proper" type of survey would show all of these plus the following:

(1) The volume of gas in M.C.F. required to replace the competitive fuel on each operation.

(2) The gas rate required to compete after allowing for all tangible and intangible factors.

(3) The cost of gas equipment.

(4) The period of maximum use of the gas, summer or winter, day or night, etc.

Armed with proper data, management can be sold on whether a new and lower gas rate or off-peak rates will improve the company's earnings and you would have the facts to justify the change. We have been somewhat remiss in presenting all of the salient facts regarding the industrial market and our first postwar endeavor should be to correct this where correction is needed. We also do not always take full advantage of the aid that is available to us from the manufacturers and there exist a few "old timers" who are still somewhat inclined to design furnaces when their real job is to sell gas and let the furnace and equipment design be handled by those better versed in this art. With each of us taking full advantage of the knowledge and equipment at our disposal we should have fewer jobs lost to competition.

In conclusion we can say that our future is by no means hopeless but is full of promise. However it can be made much more fruitful and even spectacular in its accomplishments if we will but do something about the following:

First: Employ a full time Director of Research.

Second: Develop low investment and low operating cost production equipment.

Third: Develop "matchless" lighting (without ever having to use a match to light any gas appliance).

Fourth: Build appliances which properly interpret our product and will thereby outperform those of our competitors.

Fifth: Establish a procedure for uncovering the lowest operating cost practices or methods, for each element of cost in producing and supplying gas service.

Sixth: Set up a procedure for uncovering the known and available methods for increasing capacities of different units of production and distribution equipment with the minimum of investment.

Seventh: Develop more economical selling methods.

Eighth: Employ an adequate and properly trained sales force in the postwar era.

Ninth: Determine the most economical B.t.u. gas to make and distribute.

Tenth: Support and cooperate with your Postwar Planning Committee in carrying out its recommendations.

Above all develop more IMPATIENT SOULS, intolerant of the lack of progress in our industry and willing to do something about it.

* Some of this variation is due to a difference in classification of customers.

Employee Goes Through Flames To Turn Off Gas

A $150,000 fire in Oakland, Calif., recently was prevented from becoming much more serious by the heroism of a Pacific Gas and Electric Company employee —Michael Keen, a fitter in the gas department in the East Bay Division.

The fire was in the plant of the Economy By-Products Company, which produces essentials for the Navy. Mr. Keen and his foreman, Ray C. Singer, speeded to the scene to turn off the gas and give whatever other assistance they could—a practice followed by Pacific Service men at all serious conflagrations. They found gas burning near the meter and threatening to ignite oil that was spilling from a 1000-gallon tank.

Mr. Keen immediately donned the asbestos suit he carries for such emergencies and, while firemen played several streams of water on the area, went through the flames to the main valve and turned off the gas.

UTILITY SAFETY

(Continued from page 193)

Prevention of accidents is so vitally a part of all company operations that it would seem unnecessary to lay such stress upon what seems to be the obvious. It is true, however, that we have not yet been able to instill sufficient safety thinking into the administrative action of those responsible for operations nor have we developed safety habits sufficiently by the workers on the job.

The safety education program naturally separates itself into different phases, none of which can be entirely effective, but the full development of all can provide the basis for successful accident prevention work. The first phase is the full support and active participation by all executives and company policies in which safety thinking is incorporated.

The second phase has to do with the very special training of foremen and superintendents who are the men on the job. These are the men who must realize the inherent dangers that exist in their respective kind of work and understand the hazards of day-to-day operations, both on and off the job so that they can intelligently watch and train their men to avoid them. Their real responsibility is to train their men to recognize the possible sources of injury, even in work that is new to them, and train them in basic safe operation procedure which can be applied to the job. The proper training of these men to analyze and study their working conditions and methods of doing work will eliminate or reduce to a minimum hazardous conditions and number of accidents.

The third phase of accident prevention work actually is the training of workers continuously day in and day out. People traditionally have a short memory and no matter how carefully the original training may have been carried out, its benefits will have been short-lived if some program for periodic emphasis and re-emphasis is not invoked. Safety education at an early age, if possible, and constant reiteration of the importance of accident prevention is the only way that a deep-seated consciousness of the necessity for safe workmanship can be developed. Safety work must be carried on until it becomes instinctive for every workman to approach his job with a desire to do it in the safest possible way and to avoid accidents throughout his daily life, both on and off the job. the part of top executives and men responsible for the destiny of every company.

NATURAL GAS PROGRAM

(Continued from page 203)

2. D. K. Stephens, Transmission-Pipeline Superintendent, Panhandle Eastern Pipe Line Company, Kansas City, Missouri
3. John A. Clark, Chief Engineer, Hope Natural Gas Company, Clarksburg, West Virginia (In collaboration with George W. McKinley)
4. Speaker to be announced. Tennessee Gas and Transmission Company, Houston, Texas
5. E. R. Cunningham, General Superintendent, Main Pipe Lines, United Gas Pipe Line Company, Shreveport, Louisiana (illustrated with movies)
6. A. W. Sommerville, Assistant to the President and Manager, Mississippi River Fuel Corporation, St. Louis, Missouri

II. Compressing Station

1. M. C. Madsen, Chief Engineer, Northern Natural Gas Company, Omaha, Nebraska
2. G. F. Brunston, Chief Engineer, Colorado Interstate Gas Company, Colorado Springs, Colorado

III. Dehydration Plants

1. T. S. Bacon, Research Engineer, Lone Star Gas Company, Dallas, Texas
2. H. J. Carson, Vice-President, Northern Natural Gas Company, Omaha, Nebraska
3. W. F. Fulton, United Gas Pipe Line Company, Shreveport, Louisiana
4. E. G. Hammerschmidt, Chief Chemist, Texoma Natural Gas Company, Fritch, Texas

Personnel Service

SERVICES OFFERED

Production or **General Superintendent** with wide experience in the latest methods of manufacture and distribution of both Coal and Water Gas, desires position with gas company with opportunity to use his knowledge in securing better operating efficiencies. Married, draft exempt, excellent physical condition. A-1 References. Available on reasonable notice. **1479.**

Young man with thorough knowledge of **modern** high and low pressure **gas distribution** practice, desires permanent position with future. Seventeen years of construction and maintenance experience in all phases. Letter giving particulars sent upon request. (38) **1480.**

Comptroller or **Accounting Executive:** Graduate civil engineer, 20 years' experience production, distribution, sales manufactured and natural gas, electricity, petroleum. Accounting, budgetary and finance; systems design for office, sales, shop and warehouse; preparation manuals, precedures and convention papers. Top-notch physical condition. Seeks immediate interview leading to post-war activity; available shortly. **1481.**

Would like position as **Superintendent** carburetted water or coal gas plant, distribution department, or both. Several years' excellent practical experience in both, with good reference. Much new and replacement plant equipment experience, and control laboratory work of coke ovens. No opportunity at present location of being utilized to greatest capacity. **1482**

POSITIONS OPEN

Leading midwest manufacturer of home heating appliances has a real opportunity for an experienced **heating appliance designer** capable of directing group activities. State experience, age, and salary expected. Address Box **0388.**

General Operating Superintendent for manufactured gas company serving mixed coal and water gas in a Southern city. Young unmarried man not subject to draft preferred if properly qualified. **0389.**

Engineer with gas measurement, pipe line, and some drilling experience. Give record of experiences and other pertinent information. **0390.**

Designing Engineer—Exceptional opportunity for permanent position with one of the major gas range manufacturers. Must be experienced in gas range design and product development. Must have the ability to coordinate design problems, performance requirements, with field problems and production operation. Must be graduate engineer. Give complete details as to qualifications, age, experience, education. **0391.**

Advisory Council

FRANK H. ADAMS.....Toledo, Ohio
BURT R. BAY.....Omaha, Nebr.
JAMES B. BLACK.....San Francisco, Calif.
E. J. BOYER.....Minneapolis, Minn.
LYMAN L. DYER.....Dallas, Texas
HAROLD L. GAIDRY.....New Orleans, La.
C. E. GALLAGHER.....Cleveland, Ohio
B. H. GARDNER.....Columbus, Ohio
N. HENRY GELLERT.....Seattle, Wash.
H. D. HANCOCK.....New York, N. Y.
R. H. HARGROVE.....Shreveport, La.
D. P. HARTSON.....Pittsburgh, Pa.
GEORGE S. HAWLEY.....Bridgeport, Conn.
W. ALTON JONES.....New York, N. Y.
E. N. KELLER.....Philadelphia, Pa.
L. A. MAYO.....Hartford, Conn.
F. A. NEWTON.....New York, N. Y.
GEORGE F. B. OWENS.....Brooklyn, N. Y.
CLIFFORD E. PAIGE.....Brooklyn, N. Y.
JOHN A. ROBERTSHAW.....Youngwood, Pa.
R. J. RUTHERFORD.....Worcester, Mass.
B. A. SEIPLE.....Asbury Park, N. J.
N. T. SELLMAN.....New York, N. Y.

AFFILIATED ASSOCIATIONS

Association of Gas Appliance and Equipment Manufacturers
Pres.—W. F. Rockwell, Pittsburgh-Equitable Meter Co., Pittsburgh, Pa.
Man. Dir.—H. Leigh Whitelaw, 60 East 42nd St., New York, N. Y.

Canadian Gas Association
Pres.—Frank D. Howell, Dominion Natural Gas Co., Ltd., Brantford, Ont.
Sec.-Tr.—G. W. Allen, 7 Astley Ave., Toronto.

Gas Meters Association of Florida-Georgia
Pres.—Irwin J. Wynn, Gainesville Gas Co., Gainesville, Fla.
Sec.-Tr.—Mildred M. Lane, Florida Public Service Co., Orlando, Fla.

Illinois Public Utilities Association
Pres.—C. W. Organ, Central Illinois Light Co., Springfield, Ill.
Sec.-Tr.—T. A. Schlink, Central Illinois Light Co., Springfield, Ill.

Indiana Gas Association
Pres.—Guy T. Henry, Central Indiana Gas Co., Muncie, Ind.
Sec.-Tr.—Paul A. McLeod, Public Service Co. of Indiana, Inc., Newcastle, Ind.

Michigan Gas Association
Pres.—Henry Fink, Michigan Consolidated Gas Co., Detroit, Mich.
Sec.-Tr.—A. G. Schroeder, Michigan Consolidated Gas Co., Grand Rapids, Mich.

Maryland Utilities Association
Pres.—Lewis Payne, Eastern Shore Public Service Co., Salisbury, Md.
Sec.—J. D. Landon, Jr., Eastern Shore Public Service Co., Salisbury, Md.

Mid-Southeastern Gas Association
Pres.—E. J. Meade, Texas Public Service Co., Austin, Texas
Sec.-Treas.—Edward W. Ruggles, North Carolina State College, Raleigh, N. C.

Mid-West Gas Association
Pres.—C. A. Bland, Iowa Power and Light Co., Des Moines, Iowa
Sec.-Tr.—Roy B. Searing, Sioux City Gas & Electric Co., Sioux City, Iowa.

Missouri Association of Public Utilities
Pres.—C. A. Semrad, St. Joseph Railway, Light, Heat and Power Co., St. Joseph, Mo.
Sec.-Tr.—N. R. Beagle, Missouri Power & Light Co., Jefferson City, Mo.
Asst. Sec.—Jesse Blythe, 103 West High St., Jefferson City, Mo.

New Jersey Gas Association
Pres.—Frank H. Darlington, Peoples Gas Co., Glassboro, N. J.
Sec.-Tr.—H. A. Sutton, Public Service Electric and Gas Co., Newark, N. J.

Ohio Gas and Oil Association
Pres.—Earl F. Shadrach, Canton, Ohio
Sec.-Tr.—Frank B. Maullar, 811 First National Bank Bldg., Columbus, Ohio.

Oklahoma Utilities Association
Pres.—E. C. Joullian, Consolidated Gas Utilities Corp., Oklahoma City, Okla.
Sec.—Kate A. Niblack, 625 Biltmore Hotel, Oklahoma City, Okla.

Pacific Coast Gas Association
Pres.—E. L. Payne, Payne Furnace and Supply Co., Beverly Hills, Calif.
Man. Dir.—Clifford Johnstone, 447 Sutter St., San Francisco, Calif.

Pennsylvania Gas Association
Pres.—W. G. B. Woodring, Allentown-Bethlehem Gas Co., Allentown, Pa.
Sec.—William Naile, Lebanon Valley Gas Co., Lebanon, Pa.

Pennsylvania Natural Gas Men's Association
Pres.—George E. Welker, United Natural Gas Co., Oil City, Pa.
Exec. Sec.—Mark Shields, Grant Bldg., Pittsburgh, Pa.

Southern Gas Association
Pres.—Frank S. Kelly, Jr., Arkansas Louisiana Gas Co., Shreveport, La.
Sec.-Tr.—L. L. Baxter, Arkansas Western Gas Co., Fayetteville, Ark.

Wisconsin Utilities Association
Pres.—John G. Felton, Northern States Power Co., La Crosse, Wis.
Exec.-Sec.—A. F. Herwig, 135 West Wells St., Milwaukee, Wis.

AMERICAN GAS ASSOCIATION

HEADQUARTERS, 420 LEXINGTON AVE., NEW YORK 17, N. Y.

OFFICERS AND DIRECTORS

President	ERNEST R. ACKER	Poughkeepsie, N. Y.
Vice-President	J FRENCH ROBINSON	Cleveland, Ohio
Treasurer	J. L. LLEWELLYN	Brooklyn, N. Y.
Managing Director	ALEXANDER FORWARD	New York, N. Y.
Assistant Managing Director	J. W. WEST, JR.	New York, N. Y.
Secretary	KURWIN R. BOYES	New York, N. Y.
Director, Publicity-Advg.	C. W. PERSON	New York, N. Y.
Sectional Vice-Pres.	O. H. RITENOUR	Washington, D. C.
Sectional Vice-Pres.	CHARLES G. YOUNG	Springfield, Mass.
Sectional Vice-Pres.	MALCOLM LEACH	Taunton, Mass.
Sectional Vice-Pres.	C. V. SORENSON	Hammond, Ind.
Sectional Vice-Pres.	CHARLES F. TURNER	Cleveland, Ohio

F. M. BANKS	Los Angeles, Calif.	E. P. NOPPEL	New York, N. Y.
R. G. BARNETT	Portland, Ore.	BRUNO RAHN	Milwaukee, Wisc.
JOHN W. BATTEN	Detroit, Mich.	HUDSON W. REED	Philadelphia, Pa.
WALTER C. BECKJORD	New York, N. Y.	COL. W. F. ROCKWELL	Pittsburgh, Pa.
ARTHUR F. BRIDGE	Los Angeles, Calif.	HERMAN RUSSELL	Rochester, N. Y.
JAMES A. BROWN	New York, N. Y.	LOUIS RUTHENBURG	Evansville, Ind.
CHARLES M. COHN	Baltimore, Md.	MARCY L. SPERRY	Washington, D. C.
N. R. FELTES	La Porte, Ind.	MAJOR T. J. STRICKLER	Kansas City, Mo.
RALPH L. FLETCHER	Providence, R. I.	E. J. TUCKER	Toronto, Ont.
D. W. HARRIS	Shreveport, La.	H. CARL WOLF	Atlanta, Ga.
D. A. HULCY	Dallas, Texas	P. S. YOUNG	Newark, N. J.
H. N. MALLON	Bradford, Pa.		

DEPARTMENT OFFICERS

MANUFACTURED GAS DEPARTMENT

Chairman	GEORGE S. HAWLEY	Bridgeport, Conn.
Secretary	A. GORDON KING	New York, N. Y.

NATURAL GAS DEPARTMENT

Chairman	J. FRENCH ROBINSON	Cleveland, Ohio
Secretary	HONORIA B. MOOMAW	New York, N. Y.

SECTION OFFICERS

ACCOUNTING—Chairman	O. H. RITENOUR	Washington, D. C.
Vice-Chairman	C. E. PACKMAN	Chicago, Ill.
Secretary	O. W. BREWER	New York, N. Y.
INDUSTRIAL AND COMMERCIAL GAS—Chairman	CHARLES G. YOUNG	Springfield, Mass.
Vice-Chairman	HARRY K. WRENCH	Minneapolis, Minn.
Secretary	EUGENE D. MILENER	New York, N. Y.
MANUFACTURERS—Chairman	MALCOLM LEACH	Taunton, Mass.
RESIDENTIAL GAS—Chairman	C. V. SORENSON	Hammond, Ind.
Vice-Chairman	J. H. WARDEN	Tulsa, Okla.
Secretary	J. W. WEST, JR.	New York, N. Y.
TECHNICAL—Chairman	CHARLES F. TURNER	Cleveland, Ohio
Vice-Chairman	L. E. KNOWLTON	Providence, R. I.
Secretary	A. GORDON KING	New York, N. Y.
PUBLICITY AND ADVERTISING COMMITTEE—Chairman	C. A. TATTERSALL	New York, N. Y.

A. G. A. TESTING LABORATORIES—1032 East 62nd Street, Cleveland 14, Ohio
1425 Grande Vista Avenue, Los Angeles, Calif.

Chairman, Managing Committee	GEORGE E. WHITWELL	Philadelphia, Pa.
Director	R. M. CONNER	Cleveland, Ohio
Supervisor, Pacific Coast Branch	W. H. VOGAN	Los Angeles, Calif.

WASHINGTON OFFICE:
George W. Bean, Fuel Consultant, Albee Bldg., Washington 5, D. C.

PRINTED IN U. S. A.